Upper Sand Creek Detention Basin

Special Provisions

Work-in-Progress 90% Design Submittal

Note: These technical special provisions work with and modify the California Department of Transportation Standard Specifications (not included herein). These technical special provisions will be packaged with the District's standard contract terms and conditions to develop a complete set of contract documents.

Date: August 19, 2010

Two electronic Special Provision packages were provided by the District: "Balfour Road Shoulder Widening (Phase 1)," dated 2010 and "York Street Pavement Reconstruction Project," dated 2008. This section was prepared assuming that the differences between the 2008 and the 2010 Special Provisions do not represent a philosophical change. For sections identified in the 5/13/10 outline as being prepared by the District, text was generally first taken from the County special provisions or the Balfour Road package. If text was not available from Balfour Road, text was taken from the York Street package.

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SECTION 10. CONSTRUCTION DETAILS

SECTION 10-1. GENERAL

10-1.01 ORDER OF WORK

[District Specification – text modified from Balfour Road project – basic text matches current county special provision.]

Order of work shall conform to the provisions in Section 5-1.05, "Order of Work," of the Standard Specifications and these special provisions.

The Contractor shall have a representative on the job site at all times while work is actually in progress whose sole duties shall be to supervise the work crews and coordinate activities pertaining to the contract operations, including traffic control and public notifications.

All work within the creek shall be completed by October 1 as required by the various regulatory permits and these special provisions. If the Contractor does not meet the deadline for being out of the creek by October 1 due to the Contractor's inability to properly plan and construct the improvements, any resultant delays in completing the work shall not be a basis for any time extensions nor additional compensation.

As required elsewhere in these special provisions, permanent erosion control materials shall be applied to all completed embankment areas and cut slopes. All erosion control materials that do not conflict with remaining work shall be installed by September 25. After October 1, at a maximum of one-week intervals, permanent erosion control materials shall be applied to newly completed embankment areas and cut slopes. The Contractor shall not unnecessarily delay the completion of embankments and cut slopes to delay application of permanent erosion control measures.

Attention is directed to "Progress Schedule (Critical Path Method)" of these special provisions regarding the submittal of a general time-scaled logic diagram within 10 days after approval of the contract. The diagram shall be submitted prior to performing any work that may be affected by any proposed deviations to the construction staging of the project.

The work shall be performed in conformance with the stages of construction shown on the plans and requirements of these special provisions. Non-conflicting work in subsequent stages may proceed concurrently with work in preceding stages, if approved by the Engineer, provided satisfactory progress is maintained in the preceding stages of construction.

Orders for reinforced concrete pipe (RCP) for the outlet works shall be placed no later than seven (7) calendar days after award of contract unless otherwise permitted by the Engineer.

At the preconstruction conference, Contractor shall submit 3 copies of the draft Diversion and Dewatering Plan to the Engineer as specified in 10-1.21 "Temporary Water Diversion and Dewatering" of these special provisions.

10-1.02 PERMITTING

[District Specification]

10-1.03 MOBILIZATION

[District Specification – text modified from previous GEI project]

Mobilization shall conform to the provisions in Section 11, "Mobilization," of the Standard Specifications and these special provisions.

Mobilization includes but is not limited to:

- Moving personnel, equipment, supplies, and incidentals to the project site.
- Establishing all facilities necessary for work on the project including, but not limited to, haul roads; staging areas; temporary office facilities for the Contractor; and temporary office facilities and equipment for the Engineer and District, as specified herein.
- Performing all other work and operations required prior to beginning work on the various Contract items on the project site including, but not limited to, preparing preconstruction submittals; obtaining all applicable permits from federal, state, and local authorities; and obtaining permissions from landowners, as required.

Before starting the work, the Contractor shall submit to the Engineer a Mobilization Plan identifying his requirements for space for temporary structures, location and approximate size of mobile and stationary equipment, and storage of materials. A proposed plan and layout shall be included for all temporary offices; sanitary facilities; storage buildings; storage yards; equipment fueling, maintenance, and storage; temporary water service and distribution; and temporary power service and distribution. If the Contractor requires more space than available on-site, the Contractor shall make arrangements for storage of materials and equipment off-site at the Contractor's own expense.

STAGING AREAS

Contractor's Mobilization Plan shall detail his proposed facility sites including office, staging, lay down, equipment fueling, and maintenance areas. By making the requested sites available to the Contractor, the District, the Engineer, Contra Costa County, and any other person or agency connected with the properties shall in no way be responsible or liable for any activity of the Contractor, Subcontractors, or any individual or organization connected with the project. All facility sites, including off-construction-site sites required by the Contractor, must be near the project. The Contractor must, at the Contractor's expense, make all arrangements including, but not limited to, clearance of non-sensitive archeological and environmental sites for facility site use. All facility sites must be approved by the District prior to use.

All staging areas used by the Contractor shall be enclosed by temporary chain-link fence with a minimum height of 6 feet.

DISTRICT / ENGINEER'S FIELD OFFICE

No later than two weeks after receiving the Notice to Proceed, the Contractor shall provide the Engineer and District with a fully functional trailer-type office. The office shall consist of two trailers, each with a minimum of 600 square feet of space. Deck area shall be screened from the sun. Condition of trailers and stairs must be clean and acceptable to Engineer. Provide locks and keys for the Engineer. The Engineer shall determine the location of the trailers. The trailers shall be securely anchored to the ground at all four corners to guard against movement during high winds. Provide a mail slot in the door of each trailer or a lockable mailbox mounted on the surface of the door. At completion of the project, the office shall remain the property of the Contractor and shall be removed from the site. Utilities shall be connected and disconnected in accordance with local codes and to the satisfaction of the Engineer. Contractor shall arrange for utility connections and pay for all utilities (power, water, heating, sewer service, phone, daily office cleaning, etc.) for the duration of the project for the trailer office.

The following office items and services for use in the trailers shall be provided by the Contractor during mobilization:

1. Office lighting and waste baskets.
2. Heating and cooling equipment. Equipment shall maintain an ambient air temperature of 70 degrees Fahrenheit.
3. Three (3) desks with drawers and 3 office chairs.
4. Two (2) drafting tables (3 feet by 6 feet) and 2 drafting chairs.
5. Vertical filing plan racks for 4 sets of 11 x 17 inch plans and 2 sets of 24 x 36 inch plans.
6. Fifteen (15) stackable chairs.
7. Three (3) bookshelves, 3 feet x 5 feet.
8. Two (2), 5-lb, non-toxic, dry chemical fire extinguishers meeting Underwriters' Laboratories, Inc.
9. Interior restroom with hot and cold water.
10. Clean and maintain all facilities and keep all equipment in good working condition.
11. Two (2) bottle water cooler with chilled and hot drinking water and cups. Contractor shall supply bottled water and cups as required for the duration of the project.
12. Miniature refrigerator approximately 5 cubic feet.
13. One cubic foot microwave.
14. Adequate security for all facilities and furnished equipment.
15. High-speed copy/ scanning machine with reduction, enlargement, and auto-document feed capable of utilizing at least the following paper sizes: letter, legal, and tabloid (11 X 17 inch)
16. Facsimile machine using 8-1/2 inch by 11 inch plain paper and separate telephone service.
17. Three (4) phone lines (1 for data, 3 for voice) and three (3) landline phones with built-in voice mail and speaker phone.

18. All necessary utilities for equipment and offices, including internet service. Service shall not be terminated without express approval by the Engineer.
19. Three (3) complete IBM compatible personal computers and 1 laser jet printer connected in a network. Computers shall have; Pentium 4 - 2 gigahertz or greater processors, 512 mb ram or greater, 40 gigabyte hard drive or greater, and Windows XP Professional. The computers shall become property of the District and will not be returned to the Contractor.
20. Color printer capable of printing at least the following paper sizes: letter, legal, and tabloid (11 X 17 inch).
21. High speed black and white laser printer.
22. Four (4), 3-foot by 6-foot folding metal tables that can be erected side by side to form an 12 foot by 6 foot conference table.
23. Three (3) hand-held radios of the same make and model as those used by the Contractor for the Work.

ADDITIONAL FACILITIES

In addition to the facilities provided for the District and the Engineer, the Contractor shall provide the following basic facilities for all project personnel:

- Drinking Water: Provide drinking water for all personnel connected with the work; transport bottled water in such a manner as to keep it clean and fresh. Serve from single service containers with paper cups or sanitary drinking fountains.
- Temporary Toilets: Provide adequate chemical toilet facilities for all individuals connected with the work, in number as required by Federal and State Safety and Occupational Standards. Keep in sanitary condition. Remove at completion of construction and disinfect premises.
- Electric Light and Power: Provide temporary light and power service as required for the work and to prevent vandalism. Provide safety switches and wiring into buildings and all required extension cords, lighting outlets, power outlets (grounded type), lamps and other equipment and accessories necessary for adequate temporary lighting and power for construction purposes. Remove temporary lighting and power and their connections at completion of the work.

PROTECTION OF MATERIALS AND PROJECT WORKS

The Contractor shall be responsible for furnishing all labor, equipment, supplies, and materials necessary to establish, maintain, and provide security of the staging areas and the project site for the duration of the project.

Provide shelters at site as required for material storage for protection against the elements, theft or other damage. The shelters shall be of sufficient size and arranged or partitioned to provide security for their contents and provide ready access for inspection and inventory.

Provide barricades, temporary fencing, handrails, shoring and other devices required by law and as necessary to protect new construction and materials and to protect all persons on the site.

In the event of potential flooding of the site and at the direction of the Engineer, the Contractor shall remove all vehicles and other mobile equipment, fuels, and soluble materials within four (4) hours of notification.

RESTORATION OF STAGING AREAS AND OTHER CONSTRUCTION AREAS

Prior to occupying any staging areas or other areas to be used by the Contractor during construction and for which District has provided or arranged access for Contractor, Contractor shall conduct topographic and photographic surveys of said areas. Topographic and photographic surveys shall be performed before any construction activities begin and again at the completion of construction. Upon completion of work, the Contractor shall restore the areas back to their pre-construction condition or better as determined by the Engineer. The District must approve final restoration of the staging areas and other areas used by the Contractor for which District has provided access.

Prior to beginning work, the Contractor shall submit topographic and photographic surveys to the Engineer for approval.

MEASUREMENT

Not applicable.

PAYMENT

(NEEDS DISTRICT REVIEW. DO WE NEED TO PROVIDE A PAYMENT SCHEDULE HERE?)

Attention is directed to Section 9-1.06, "Partial Payments," and Section 9-1.07, "Payment After Acceptance," of the Standard Specifications.

The contract lump sum price paid for mobilization shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all work involved in mobilization and as specified herein.

10-1.04 WATER POLLUTION CONTROL

[District Specification – text modified from Balfour Road project] [note to District – should entity "County" be replaced by "District"?]

Water pollution control work shall conform to the provisions in Section 7-1.01G, "Water Pollution," of the Standard Specifications and these special provisions.

This project lies within the boundaries of the San Francisco Region or Central Valley Region Regional Water Quality Control Board (RWQCB).

The County has submitted a Notice Of Intent to the RWQCB which references and incorporates by reference the current Statewide General Permit issued by the SWRCB entitled "Order No. 99-08-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000002, Waste Discharge Requirements (WDRs) for Discharges of Storm Water Associated with Construction Activity," which regulates discharges of storm water and non-storm water from construction activities disturbing 1 acre or more of soil in a common plan of development.

Sampling and analysis requirements as specified in SWRCB Resolution No. 2001-46 are added to the Statewide General Permit. Copies of the Statewide General Permit and modifications thereto are available for review from the SWRCB, Storm Water Permit Unit, 1001 "I" Street, P.O. Box 1977, Sacramento, California 95812-1977, Telephone: (916) 341-5254 and may also be obtained from the SWRCB Internet website at: http://www.swrcb.ca.gov/stormwtr/construction.html.

The NPDES permit that regulates this project, as referenced above, is hereafter referred to as the "Permit."

This project shall conform to the Permit and modifications thereto. The Contractor shall maintain copies of the Permit at the project site and shall make the Permit available during construction.

The Permit requires the preparation of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP shall be prepared in conformance with the requirements of the Permits. The State of California Department of Transportation (Caltrans) "Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual," and the Caltrans "Construction Site Best Management Practices (BMPs) Manual," including addenda to those permits and manuals issued up to and including the date of advertisement of the project are recommended as references for preparation of the SWPPP. These manuals are hereinafter referred to, respectively, as the "Preparation Manual" and the "Construction Site BMPs Manual," and collectively, as the "Manuals." Copies of the Manuals may be obtained from the Department of Transportation, Material Operations Branch, Publication Distribution Unit, 1900 Royal Oaks Drive, Sacramento, California 95815, Telephone: (916) 445-3520, and may also be obtained from the Department's Internet website at: http://www.dot.ca.gov/hq/construc/stormwater/stormwater1html.

The Contractor shall know and fully comply with applicable provisions of the Permit and all modifications thereto, the Manuals, and Federal, State, and local regulations and requirements that govern the Contractor's operations and storm water and non-storm water discharges from both the project site and areas of disturbance outside the project limits during construction. Attention is directed to Sections 7-1.01, "Laws to be Observed," and 7-1.12, "Indemnification and Insurance," of the Standard Specifications.

The Permit shall apply to storm water and certain permitted non-storm water discharges from areas outside the project site which are directly related to construction activities for this contract including, but not limited to, material borrow areas, concrete plants, staging areas, storage yards, and access roads. The Contractor shall comply with the Permit and the Manuals for those areas and shall implement, inspect, and maintain the required water pollution control practices. The Engineer shall be allowed full access to these areas outside the project site during construction to assure Contractor's proper implementation of water pollution control practices. Installing, inspecting, and maintaining water pollution control practices on areas outside the highway right of way not specifically arranged and provided for by the County for the execution of this contract, will not be paid for.

The Contractor shall be responsible for penalties assessed or levied on the Contractor or the County as a result of the Contractor's failure to comply with the provisions in this section "Water Pollution Control" including, but not limited to, compliance with the applicable provisions of the Permit, the Manuals, and Federal, State and local regulations and requirements as set forth therein.

Penalties as used in this section, "Water Pollution Control," shall include fines, penalties and damages, whether proposed, assessed, or levied against the County or the Contractor, including those levied under the Federal Clean Water Act and the State Porter-Cologne Water Quality Control

Act, by governmental agencies or as a result of citizen suits. Penalties shall also include payments made or costs incurred in settlement for alleged violations of the Permit, the Manuals, or applicable laws, regulations, or requirements. Costs incurred could include sums spent instead of penalties, in mitigation or to remediate or correct violations.

RETENTION OF FUNDS

Notwithstanding any other remedies authorized by law, the County may retain money due the Contractor under the contract, in an amount determined by the County, up to and including the entire amount of Penalties proposed, assessed, or levied as a result of the Contractor's violation of the Permit, the Manuals, or Federal or State law, regulations or requirements. Funds may be retained by the County until final disposition has been made as to the Penalties. The Contractor shall remain liable for the full amount of Penalties until such time as they are finally resolved with the entity seeking the Penalties.

Retention of funds for failure to conform to the provisions in this section, "Water Pollution Control," shall be in addition to the other retention amounts required by the contract. The amounts retained for the Contractor's failure to conform to provisions in this section will be released for payment on the next monthly estimate for partial payment following the date when an accepted SWPPP has been implemented and maintained, and when water pollution has been adequately controlled, as determined by the Engineer.

When a regulatory agency identifies a failure to comply with the Permit and modifications thereto, the Manuals, or other Federal, State or local requirements, the County may retain money due the Contractor, subject to the following:

A. The County will give the Contractor 30 days notice of the County's intention to retain funds from partial payments which may become due to the Contractor prior to acceptance of the contract. Retention of funds from payments made after acceptance of the contract may be made without prior notice to the Contractor.
B. No retention of additional amounts out of partial payments will be made if the amount to be retained does not exceed the amount being withheld from partial payments pursuant to Section 9-1.06, "Partial Payments," of the Standard Specifications.
C. If the County has retained funds, and it is subsequently determined that the State is not subject to the entire amount of the Costs and Liabilities assessed or proposed in connection with the matter for which the retention was made, the County shall be liable for interest on the amount retained for the period of the retention. The interest rate payable shall be 6 percent per annum.

During the first estimate period that the Contractor fails to conform to the provisions in this section, "Water Pollution Control," the County may retain an amount equal to 25 percent of the estimated value of the contract work performed.

The Contractor shall notify the Engineer immediately upon request from the regulatory agencies to enter, inspect, sample, monitor, or otherwise access the project site or the Contractor's records pertaining to water pollution control work. The Contractor and the County shall provide copies of correspondence, notices of violation, enforcement actions or proposed fines by regulatory agencies to the requesting regulatory agency.

STORM WATER POLLUTION PREVENTION PLAN PREPARATION, ACCEPTANCE AND AMENDMENTS

As part of the water pollution control work, a Storm Water Pollution Prevention Plan (SWPPP) is required for this contract. The SWPPP shall conform to the provisions in Section 7-1.01G, "Water Pollution," of the Standard Specifications, the requirements in the Manuals, the requirements of the Permits, these special provisions and guidance provided by the SWRCB (http://www.swrcb.ca.gov/stormwtr/construction.html, click on Construction). Upon the Engineer's acceptance of the SWPPP, the SWPPP shall be considered to fulfill the provisions in Section 7-1.01G, "Water Pollution," of the Standard Specifications for development and submittal of a Water Pollution Control Program.

For the Contractor's convenience, the Contractor may use the Agency-specific SWPPP template, which is available on the Agency's website, to prepare the draft SWPPP (http://www.co.contra-costa.ca.us/index.aspx?NID=429). The Contractor is discouraged from using Caltrans' template because it contains language that conflicts with this special provision.

No work having potential to cause water pollution shall be performed until the SWPPP has been accepted by the Engineer and a copy is located on the project site. Acceptance shall not constitute a finding that the SWPPP complies with applicable requirements of the Permit, the Manuals, and applicable Federal, State and local laws, regulations, and requirements. The Contractor is solely responsible for compliance with said laws, regulations, and requirements.

The Contractor shall designate a Water Pollution Control Manager. The Water Pollution Control Manager shall be responsible for the preparation of the SWPPP and required modifications or amendments and shall be responsible for the implementation and adequate functioning of the various water pollution control practices employed. The Contractor may designate different Water Pollution Control Managers to prepare the SWPPP and to implement the water pollution control practices. The Water Pollution Control Managers shall serve as the primary contact for issues related to the SWPPP or its implementation. The Contractor shall submit a statement of qualifications to the Engineer, describing the training, previous work history, and expertise of the individual(s) selected by the Contractor to serve as Water Pollution Control Manager. The Water Pollution Control Manager shall have a minimum of 24 hours of formal storm water management training or certification as a Certified Professional in Erosion and Sediment Control (CPESC). The Engineer will reject the Contractor's submission of a Water Pollution Control Manager if the submitted qualifications are deemed to be inadequate.

Within 10 working days after the approval of the contract, the Contractor shall submit 3 copies of the draft SWPPP to the Engineer. The Engineer will have 10 working days to review the SWPPP. If revisions are required, as determined by the Engineer, the Contractor shall revise and resubmit the SWPPP within 3 working days of receipt of the Engineer's comments. The Engineer will have 2 working days to review the revisions. Upon the Engineer's acceptance of the SWPPP, 3 accepted copies of the SWPPP, incorporating the required changes, shall be submitted to the Engineer. In order to allow construction activities to proceed, the Engineer may conditionally accept the SWPPP while minor revisions are being completed. In the event the Engineer fails to complete the review within the time allowed, and if, in the opinion of the Engineer, completion of the work is delayed or interfered with by reason of the Engineer's delay in completing the review, the Contractor will be compensated for resulting losses, and an extension of time will be granted, in the same manner as provided for in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

The SWPPP shall apply to the areas within and those areas outside of the project right of way that are directly related to construction operations including, but not limited to, material borrow areas, concrete plants, staging areas, storage yards, and access roads.

The SWPPP shall incorporate water pollution control practices in the following categories:

A. Soil stabilization.
B. Sediment control.
C. Wind erosion control.
D. Tracking control.
E. Non-storm water management.
F. Waste management and materials pollution control.

The Contractor shall develop and include in the SWPPP the Sampling and Analysis Plan(s) as required by the Permit, and modifications thereto, and as required in "Sampling and Analytical Requirements" of this section.

The Contractor shall develop a Water Pollution Control Schedule that describes the timing of grading or other work activities that could affect water pollution. The Water Pollution Control Schedule shall be updated by the Contractor to reflect changes in the Contractor's operations that would affect the necessary implementation of water pollution control practices.

The Contractor shall complete the "Construction Site BMPs Consideration Checklist" presented in the Preparation Manual and shall incorporate water pollution control practices into the SWPPP. Water pollution control practices include the "Minimum Requirements" and other Contractor-selected water pollution control practices from the "Construction Site BMPs Consideration Checklist" and the "Project-Specific Minimum Requirements" identified in the Water Pollution Control Cost Break-Down of this section.

~~The following contract items of work shall be incorporated into the SWPPP as "Temporary Water Pollution Control Practices": _____. The Contractor's attention is directed to the special provisions provided for Temporary Water Pollution Control Practices.~~

The following contract items of work, as shown on the project plans or as specified elsewhere in these special provisions, shall be identified in the SWPPP as permanent water pollution control practices: Erosion Control (Hydroseed). These permanent water pollution control practices shall be constructed as specified in "Order of Work" of these special provisions, and utilized during the construction period. The Contractor shall maintain and protect the permanent water pollution control practices throughout the duration of the project and shall restore these controls to the lines, grades and condition shown on the plans prior to acceptance of the contract.

The SWPPP shall include, but not be limited to, the items described in the Manuals, Permit and related information contained in the contract documents. The SWPPP shall also include a copy of the following: _____ .

The Contractor shall prepare an amendment to the SWPPP when there is a change in construction activities or operations which may affect the discharge of pollutants to surface waters, ground waters, municipal storm drain systems, or when the Contractor's activities or operations violate a condition of the Permits, or when directed by the Engineer. Amendments shall identify additional water pollution control practices or revised operations, including those areas or operations not identified in the initially accepted SWPPP. Amendments to the SWPPP shall be prepared and submitted for review and accepted within a time accepted by the Engineer, but in no case longer than the time specified for the initial submittal and review of the SWPPP. At a

minimum, the SWPPP shall be amended annually and submitted to the Engineer 25 days prior to the defined rainy season.

The Contractor shall keep one copy of the accepted SWPPP and accepted amendments at the project site at all times. The SWPPP shall be made available upon request by a representative of the Regional Water Quality Control Board, State Water Resources Control Board, United States Environmental Protection Agency, or the local storm water management agency. Requests by the public shall be directed to the Engineer.

COST BREAK-DOWN

The Contractor shall include a Water Pollution Control Cost Break-Down in the SWPPP which itemizes the contract lump sum for water pollution control work. The Contractor shall use the Water Pollution Control Cost Break-Down provided in this section as the basis for the cost break-down submitted with the SWPPP. The Contractor shall use the Water Pollution Control Cost Break-Down to identify items, quantities, and values for water pollution control work, excluding ~~Temporary~~Permanent Water Pollution Control Practices for which there are separate bid items. The Contractor shall be responsible for the accuracy of the quantities and values used in the cost break-down submitted with the SWPPP. Partial payment for the item of water pollution control will not be made until the Water Pollution Control Cost Break-Down is accepted by the Engineer.

Line items indicated in the Water Pollution Control Cost Break-Down in this section with a specified Estimated Quantity shall be considered "Project-Specific Minimum Requirements." The Contractor shall incorporate Project-Specific Minimum Requirements with Contractor-designated quantities and values into the Water Pollution Control Cost Break-Down submitted with the SWPPP.

Line items indicated in the Water Pollution Control Cost Break-Down in this section without a specified Estimated Quantity shall be considered by the Contractor for selection to meet the applicable "Minimum Requirements" as defined in the Manuals, or for other water pollution control work as identified in the "Construction Site BMPs Consideration Checklist" presented in the Preparation Manual. In the Water Pollution Control Cost Break-Down submitted with the SWPPP, the Contractor shall list only those water pollution control practices selected for the project, including quantities and values required to complete the work for those items.

The sum of the amounts for the items of work listed in the Water Pollution Control Cost Break-Down shall be equal to the contract lump sum price bid for water pollution control. Overhead and profit shall be included in the individual items listed in the cost break-down.

WATER POLLUTION CONTROL COST BREAK-DOWN

Project No.: _____

ITEM	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	VALUE	AMOUNT
SS-3	Hydraulic Mulch	SQ YD			

ITEM	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	VALUE	AMOUNT
SS-4	Hydroseeding	SQ YD			
SS-5	Soil Binders	SQ YD			
SS-6	Straw Mulch	SQ YD			
SS-7	Geotextiles, Plastic Covers & Erosion Control Blankets/Mats	SQ YD			
SS-8	Wood Mulching	SQ YD			
SS-9	Earth Dikes/Drainage Swales & Lined Ditches	LF			
SS-10	Outlet Protection/Velocity Dissipation Devices	EA			
SS-11	Slope Drains	EA			
SC-1	Silt Fence	LF			
SC-2	Desilting Basin	EA			
SC-3	Sediment Trap	EA			
SC-4	Check Dam	EA			
SC-5	Fiber Rolls	LF			
SC-6	Gravel Bag Berm	LF			
SC-7	Street Sweeping and Vacuuming	LS			
SC-8	Sandbag Barrier	LF			
SC-9	Straw Bale Barrier	LF			
SC-10	Storm Drain Inlet Protection	EA			
WE-1	Wind Erosion Control	LS			
TC-1	Stabilized Construction Entrance/Exit	EA			
TC-2	Stabilized Construction Roadway	EA			
TC-3	Entrance/Outlet Tire Wash	EA			
NS-1	Water Conservation Practices	LS			
NS-2	Dewatering Operations	EA			
NS-3	Paving and Grinding Operations	LS			

ITEM	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	VALUE	AMOUNT
NS-4	Temporary Stream Crossing	EA			
NS-5	Clear Water Diversion	EA			
NS-6	Illicit Connection/Illegal Discharge Detection and Reporting	LS			
NS-7	Potable Water/Irrigation	LS			
NS-8	Vehicle and Equipment Cleaning	LS			
NS-9	Vehicle and Equipment Fueling	LS			
NS-10	Vehicle and Equipment Maintenance	LS			
NS-11	Pile Driving Operations				
NS-12	Concrete Curing				
NS-13	Material and Equipment Use Over Water				
NS-14	Concrete Finishing				
NS-15	Structure Demolition/Removal Over or Adjacent to Water				
WM-1	Material Delivery and Storage	LS			
WM-2	Material Use	LS			
WM-3	Stockpile Management	LS			
WM-4	Spill Prevention and Control	LS			
WM-5	Solid Waste Management	LS			
WM-6	Hazardous Waste Management	LS			
WM-7	Contaminated Soil Management	LS			
WM-8	Concrete Waste Management	LS			
WM-9	Sanitary/Septic Waste Management	LS			
WM-10	Liquid Waste Management	LS			

TOTAL _____

Adjustments in the items of work and quantities listed in the accepted cost break-down shall be made when required to address amendments to the SWPPP, except when the adjusted items are paid for as extra work.

No adjustment in compensation will be made to the contract lump sum price paid for water pollution control due to differences between the quantities shown in the accepted cost break-down and the quantities required to complete the work as shown on the accepted SWPPP. No adjustment in compensation will be made for ordered changes to correct SWPPP work resulting from the Contractor's own operations or from the Contractor's negligence.

The accepted cost break-down will be used to determine partial payments during the progress of the work and as the basis for calculating the adjustment in compensation for the item of water pollution control due to increases or decreases of quantities ordered by the Engineer. When an ordered change increases or decreases the quantities of an accepted cost break-down item, the adjustment in compensation will be determined in the same manner specified for increases and decreases in the quantity of a contract item of work in conformance with the provisions in Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications. If an ordered change requires a new item which is not on the accepted cost break-down, the adjustment in compensation will be determined in the same manner specified for extra work in conformance with Section 4-1.03D, "Extra Work," of the Standard Specifications.

SWPPP IMPLEMENTATION

Unless otherwise specified, upon acceptance of the SWPPP, the Contractor shall be responsible throughout the duration of the project for installing, constructing, inspecting, maintaining, removing, and disposing of the water pollution control practices specified in the SWPPP and in the amendments. Unless otherwise directed by the Engineer, the Contractor's responsibility for SWPPP implementation shall continue throughout temporary suspensions of work ordered in conformance with the provisions in Section 8-1.05, "Temporary Suspension of Work," of the Standard Specifications. Requirements for installation, construction, inspection, maintenance, removal, and disposal of water pollution control practices shall conform to the requirements in the Manuals and these special provisions.

Before the start of job site activities, the Contractor shall provide training for project managers, supervisory personnel, and employees involved with water pollution control work. The training shall include:

A. Rules and regulations
B. Implementation and maintenance for:

1. Temporary Soil Stabilization
2. Temporary Sediment Control
3. Tracking Control
4. Wind Erosion Control
5. Non-storm water management.
6. Waste management and materials pollution control.

If the Contractor or the Engineer identifies a deficiency in the implementation of the accepted SWPPP or amendments, the deficiency shall be corrected immediately unless requested by the

Contractor and accepted by the Engineer in writing, but shall be corrected prior to the onset of precipitation. If the Contractor fails to correct the identified deficiency by the date agreed or prior to the onset of precipitation, the project shall be in nonconformance with this section, "Water Pollution Control." Attention is directed to Section 5-1.01, "Authority of Engineer," of the Standard Specifications, and to "Retention of Funds" of this section for possible nonconformance penalties.

If the Contractor fails to conform to the provisions of this section, "Water Pollution Control," the Engineer may order the suspension of construction operations until the project complies with the requirements of this section.

Implementation of water pollution control practices may vary by season. The Construction Site BMPs Manual and these special provisions shall be followed for control practice selection of year-round, rainy season and non-rainy season water pollution control practices.

Year-Round Implementation Requirements

The Contractor shall have a year-round program for implementing, inspecting and maintaining water pollution control practices for wind erosion control, tracking control, non-storm water management, and waste management and materials pollution control.

The National Weather Service weather forecast shall be monitored and used by the Contractor on a daily basis. An alternative weather forecast proposed by the Contractor may be used if accepted by the Engineer. If precipitation is predicted, the necessary water pollution control practices shall be deployed prior to the onset of the precipitation.

Disturbed soil areas shall be considered active whenever the soil disturbing activities have occurred, continue to occur, or will occur during the ensuing 21 days. Non-active areas shall be protected as prescribed in the Construction Site BMPs Manual within 14 days of cessation of soil disturbing activities or prior to the onset of precipitation, whichever occurs first.

In order to provide effective erosion control, the Contractor may be directed by the Engineer to apply permanent erosion control in small or multiple units. The Contractor's attention is directed to ~~"Erosion Control (Type C)",~~ "Erosion control (hydroseed)" ~~and "Move-In/Move-Out (Erosion Control)"~~ of these special provisions.

The Contractor shall implement, maintain and inspect the ~~following~~ temporary sediment control practices on a year-round basis. The ~~listed~~ practices shall remain in place until their use is no longer needed, as determined by the Engineer.

~~YEAR-ROUND SEDIMENT CONTROL PRACTICES~~	~~LOCATION USED~~

Soil stabilization and sediment control practices conforming to the requirements of these special provisions shall be provided throughout the rainy season, defined as between October 1 and April 15.

An implementation schedule of required soil stabilization and sediment control practices for disturbed soil areas shall be completed no later than 20 days prior to the beginning of each rainy season. The implementation schedule shall identify the soil stabilization and sediment control

practices and the dates when the implementation will be 25 percent, 50 percent and 100 percent complete, respectively. For construction activities beginning during the rainy season, the Contractor shall implement applicable soil stabilization and sediment control practices.

Throughout the defined rainy season, the active disturbed soil area of the project site shall be not more than ____ acre. The Engineer may accept, on a case-by-case basis, expansions of the active disturbed soil area limit. Soil stabilization and sediment control materials shall be maintained on site sufficient to protect disturbed soil areas. A detailed plan for the mobilization of sufficient labor and equipment shall be maintained to deploy the water pollution control practices required to protect disturbed soil areas prior to the onset of precipitation.

Non-Rainy Season Implementation Requirements

The non-rainy season shall be defined as days outside the defined rainy season. The Contractor's attention is directed to the Construction Site BMPs Manual for soil stabilization and sediment control implementation requirements on disturbed soil areas during the non-rainy season. Disturbed soil areas within the project shall be protected in conformance with the requirements in the Construction Site BMPs Manual with an effective combination of soil stabilization and sediment control.

MAINTENANCE

To ensure the proper implementation and functioning of water pollution control practices, the Contractor shall regularly inspect and maintain the construction site for the water pollution control practices identified in the SWPPP. The construction site shall be inspected by the Contractor as follows:

A. Prior to a forecast storm.
B. After a precipitation event which causes site runoff.
C. At 24 hour intervals during extended precipitation events.
D. Routinely, a minimum of once every month outside of the defined rainy season.
E. Routinely, a minimum of weekly during the defined rainy season.

The Contractor shall use the Storm Water Quality Construction Site Inspection Checklist attached to these special provisions (where?). One copy of each site inspection record shall be submitted to the Engineer within 24 hours of completing the inspection. Inspect records and general guidelines can be obtained at Caltrans website http://www.dot.ca.gov/hq/construct/storm_water.pdf.

REPORTING REQUIREMENTS

Report of Discharges, Notices or Orders

If the Contractor identifies discharges into surface waters or drainage systems in a manner causing, or potentially causing, a condition of pollution, or if the project receives a written notice or order from a regulatory agency, the Contractor shall immediately inform the Engineer. The Contractor shall submit a written report to the Engineer within ___ days of the discharge event, notice or order. The report shall include the following information:

A. The date, time, location, nature of the operation, and type of discharge, including the cause or nature of the notice or order.

B. The water pollution control practices deployed before the discharge event, or prior to receiving the notice or order.
C. The date of deployment and type of water pollution control practices deployed after the discharge event, or after receiving the notice or order, including additional measures installed or planned to reduce or prevent reoccurrence.
D. An implementation and maintenance schedule for affected water pollution control practices.

Report of First-Time Non-Storm Water Discharge

The Contractor shall notify the Engineer at least 3 days in advance of first-time non-storm water discharge events, excluding exempted discharges. The Contractor shall notify the Engineer of the operations causing non-storm water discharges and shall obtain field approval for first-time non-storm water discharges. Non-storm water discharges shall be monitored at first-time occurrences and routinely thereafter.

Annual Certifications

By June 15 of each year, the Contractor shall complete and submit an Annual Certification of Compliance, as contained in the Preparation Manual, to the Engineer.

SAMPLING AND ANALYTICAL REQUIREMENTS

The Contractor is required to implement specific sampling and analytical procedures ~~to determine whether BMPs implemented on the construction site are preventing pollutants that are known or should be known by permittees to occur on construction sites that are not visually detectable in storm water discharges, to cause or contribute to exceedances of water quality objectives~~ in accordance with this section, "Sampling and Analytical Requirements".

The Contractor shall conduct his activities to eliminate the probable potential for non-visible pollutants discharging directly to a water of the US or a drainage system that discharges into a water of the US. If Contractor allows contamination to occur, they are responsible for all costs associated with implementing the sampling and analysis plan, clean up, fines, etc.

Non-Visible Pollutants

The project has the potential to discharge non-visible pollutants in storm water from the construction site. The project SWPPP shall contain a Sampling and Analysis Plan (SAP) that describes the sampling and analysis strategy and schedule to be implemented on the project for monitoring non-visible pollutants in conformance with this section.

The SAP shall identify potential non-visible pollutants that are known or should be known to occur on the construction site associated with the following: (1) construction materials, wastes or operations; (2) known existing contamination due to historical site usage; or (3) application of soil amendments, including soil stabilization products, with the potential to alter pH or contribute toxic pollutants to storm water. Planned material and waste storage areas, locations of known existing contamination, and areas planned for application of soil amendments shall be shown on the SWPPP Water Pollution Control Drawings.

The SAP shall identify a sampling schedule for collecting a sample down gradient from the applicable non-visible pollutant source and a sufficiently large uncontaminated control sample during the first two hours of discharge from rain events during daylight hours which result in a

sufficient discharge for sample collection. If run-on occurs onto the non-visible pollutant source, a run-on sample that is immediately down gradient of the run-on to the Department's right of way shall be collected. A minimum of 72 hours of dry weather shall occur between rain events to distinguish separate rain events.

The SAP shall state that water quality sampling will be triggered when any of the following conditions are observed during the required storm water inspections conducted before or during a rain event:

A. Materials or wastes containing potential non-visible pollutants are not stored under watertight conditions.
B. Materials or wastes containing potential non-visible pollutants are stored under watertight conditions, but (1) a breach, leakage, malfunction, or spill is observed; and (2) the leak or spill has not been cleaned up prior to the rain event; and (3) there is the potential for discharge of non-visible pollutants to surface waters or drainage system.
C. Construction activities, such as application of fertilizer, pesticide, herbicide, methyl methacrylate concrete sealant, or non-pigmented curing compound have occurred during a rain event or within 24 hours preceding a rain event, and there is the potential for discharge of pollutants to surface waters or drainage system.
D. Soil amendments, including soil stabilization products, with the potential to alter pH levels or contribute toxic pollutants to storm water runoff have been applied, and there is the potential for discharge of pollutants to surface waters or drainage system (unless independent test data are available that demonstrate acceptable concentration levels of non-visible pollutants in the soil amendment).
E. Storm water runoff from an area contaminated by historical usage of the site is observed to combine with storm water, and there is the potential for discharge of pollutants to surface waters or drainage system.

The SAP shall identify sampling locations for collecting down gradient and control samples, and the rationale for their selection. The control sampling location shall be selected where the sample does not come into contact with materials, wastes or areas associated with potential non-visible pollutants or disturbed soil areas. Sampling locations shall be shown on the SWPPP Water Pollution Control Drawings. Only trained personnel shall collect water quality samples and be identified in the SAP. Qualifications of designated sampling personnel shall describe training and experience, and shall be included in the SWPPP. The SAP shall state monitoring preparation, sample collection procedures, quality assurance/quality control, sample labeling procedures, sample collection documentation, sample shipping and chain of custody procedures, sample numbering system, and reference the construction site health and safety plan.

The SAP shall identify the analytical method to be used for analyzing down gradient and control samples for potential non-visible pollutants on the project. For samples analyzed in the field by sampling personnel, collection, analysis, and equipment calibration shall be in conformance with the Manufacturer's specifications. For samples that will be analyzed by a laboratory, sampling, preservation, and analysis shall be performed by a State-certified laboratory in conformance with 40 CFR 136. The SAP shall identify the specific State-certified laboratory, sample containers, preservation requirements, holding times, and analysis method to be used. A list of State-certified laboratories that are accepted by the Department is available at the following internet site: http://www.dhs.ca.gov/ps/ls/elap/html/lablist_county.htm.

Analytical Results and Evaluation

The Contractor shall submit a hard copy and electronic copy of water quality analytical results and quality assurance/quality control data to the Engineer within 5 days of sampling for field analyses and within 30 days for laboratory analyses. Analytical results shall be accompanied by an evaluation from the Contractor to determine if down gradient samples show elevated levels of the tested parameter relative to levels in the control sample. If down gradient or downstream samples, as applicable, show increased levels, the Contractor will assess the BMPs, site conditions, and surrounding influences to determine the probable cause for the increase. As determined by the assessment, the Contractor will repair or modify BMPs to address increases and amend the SWPPP as necessary. Electronic results (in one of the following file formats: .xls, .txt, .csv, .dbs, or .mdb) shall have at a minimum the following information: sample identification number, contract number, constituent, reported value, method reference, method detection limit, and reported detection limit. The Contractor shall document sample collection during rain events.

Water quality sampling documentation and analytical results shall be maintained with the SWPPP on the project site until a Notice of Completion has been submitted and accepted.

If construction activities or knowledge of site conditions change, such that discharges or sampling locations change, the Contractor shall amend the SAP in conformance with this section, "Water Pollution Control."

All costs associated with implementing the sampling and analysis plan under the conditions stated in this special provision shall be borne solely by the contractor.

PAYMENT

The contract lump sum price paid for prepare storm water pollution prevention plan shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals for doing all the work involved in developing, preparing, obtaining approval of, revising, and amending the SWPPP, including development of a sampling and analysis plan as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Attention is directed to Section 9-1.06, "Partial Payments," and Section 9-1.07, "Payment After Acceptance," of the Standard Specifications. Payments for prepare storm water pollution prevention plan will be made as follows:

A. After the SWPPP has been accepted by the Engineer, 75 percent of the contract item price for prepare storm water pollution prevention plan will be included in the monthly partial payment estimate.
B. After acceptance of the contract in conformance with the provisions in Section 7-1.17, "Acceptance of Contract," of the Standard Specifications, payment for the remaining 25 percent of the contract item price for prepare storm water pollution prevention plan will be made in conformance with the provisions in Section 9-1.07.

The contract lump sum price paid for water pollution control shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing, constructing, removing, and disposing of water pollution control practices, including non-storm water management, and waste management and materials pollution water pollution control practices, except those for which there is a contract item of work as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.05 CONSTRUCTION SITE MANAGEMENT

[District Specification – text modified from Balfour Road project [notes to District – should entity "County" be replaced by "District"? Possible text for deletion marked with strikethrough font.]]

Construction site management shall consist of controlling potential sources of water pollution before they come in contact with storm water systems or watercourses. The Contractor shall control material pollution and manage waste and non-storm water existing at the construction site by implementing effective handling, storage, use, and disposal practices.

Attention is directed to "Water Pollution Control" of these special provisions regarding the Contractor's appointment of a water pollution control manager (WPCM) for the project.

The Contractor shall train all employees and subcontractors regarding:

A. Material pollution prevention and control;
B. Waste management;
C. Non-storm water management;
D. Identifying and handling hazardous substances; and
E. Potential dangers to humans and the environment from spills and leaks or exposure to toxic or hazardous substances.

Training shall take place before starting work on this project. New employees shall receive the complete training before starting work on this project. The Contractor shall have regular meetings to discuss and reinforce spill prevention and control; material delivery, storage, use, and disposal; waste management; and non-storm water management procedures.

Instructions for material and waste handling, storage, and spill reporting and cleanup shall be posted at all times in an open, conspicuous, and accessible location at the construction site.

Nonhazardous construction site waste and excess material shall be recycled when practical or disposed of in accordance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications, unless otherwise specified.

Vehicles and equipment at the construction site shall be inspected by the WPCM on a frequent, predetermined schedule, and by the operator each day of use. Leaks shall be repaired immediately, or the vehicle or equipment shall be removed from the construction site.

SPILL PREVENTION AND CONTROL

The Contractor shall implement spill and leak prevention procedures when chemicals or hazardous substances are stored. Spills of petroleum products; substances listed under CFR Title 40, Parts 110, 117, and 302; and sanitary and septic waste shall be contained and cleaned up as soon as is safe.

Minor spills involve small quantities of oil, gasoline, paint, or other material that can be controlled by the first responder upon discovery of the spill. Cleanup of minor spills includes:

A. Containing the spread of the spill,
B. Recovering the spilled material using absorption,
C. Cleaning the contaminated area, and
D. Disposing of contaminated material promptly and properly.

Semi-significant spills are those that can be controlled by the first responder with the help of other personnel. Cleanup of semi-significant spills shall be immediate. Cleanup of semi-significant spills includes:

A. Containing the spread of the spill;
B. Recovering the spilled material using absorption if the spill occurs on paved or an impermeable surface;
C. Containing the spill with an earthen dike and digging up contaminated soil for disposal if the spill occurs on dirt;
D. Covering the spill with plastic or other material to prevent contaminating runoff if the spill occurs during precipitation; and
E. Disposing of contaminated material promptly and properly.

Significant or hazardous spills are those that cannot be controlled by construction personnel. Notifications of these spills shall be immediate. The following steps shall be taken:

A. Construction personnel shall not attempt to clean up the spill until qualified staff have arrived;
B. Notify the Engineer and follow up with a written report;
C. Obtain the services of a spills contractor or hazardous material team immediately;
D. Notify the local emergency response team by dialing 911 and county officials at the emergency phone numbers kept on the construction site;
E. Notify the Governor's Office of Emergency Services Warning Center at (805) 852-7550;
F. Notify the National Response Center at (800) 424-8802 regarding spills of Federal reportable quantities in conformance with CFR Title 40, Parts 110, 119, and 302;
G. Notify other agencies as appropriate, including:

1. Fire Department,
2. Public Works Department,
3. Coast Guard,
4. Highway Patrol,
5. City Police or County Sheriff Department,
6 Department of Toxic Substances,
7. California Division of Oil and Gas,
8. Cal OSHA, or
9. Regional Water Resources Control Board.

The WPCM shall oversee and enforce proper spill prevention and control measures. Minor, semi-significant, and significant spills shall be reported to the Contractor's WPCM who shall notify the Engineer immediately.

The Contractor shall prevent spills from entering storm water runoff before and during cleanup. Spills shall not be buried or washed with water.

The Contractor shall keep material or waste storage areas clean, well organized, and equipped with enough cleanup supplies for the material being stored. Plastic shall be placed under paving equipment when not in use to catch drips.

MATERIAL MANAGEMENT

Material shall be delivered, used, and stored for this contract in a manner that minimizes or eliminates discharge of material into the air, storm drain systems, or watercourses.

The Contractor shall implement the practices described in this section when taking delivery of, using, or storing the following materials:

A. Hazardous chemicals including:

1. Acids,
2. Lime,
3. Glues,
4. Adhesives,
5. Paints,
6. Solvents, and
7. Curing compounds;

B. Soil stabilizers and binders;
C. Fertilizers;
D. Detergents;
E. Plaster;
F. Petroleum products including:

1. Fuel,
2. Oil, and
3. Grease;

G. Asphalt components and concrete components; and
H. Pesticides and herbicides.

The Contractor shall supply the Material Safety Data Sheet to the Engineer for material used or stored. The Contractor shall keep an accurate inventory of material delivered and stored at the construction site.

Employees trained in emergency spill cleanup procedures shall be present when hazardous materials or chemicals are unloaded.

The Contractor shall use recycled or less hazardous products when practical.

Material Storage

The Contractor shall store liquids, petroleum products, and substances listed in CFR Title 40, Parts 110, 117, and 302 in containers or drums approved by the United States Environmental Protection Agency, and place them in secondary containment facilities.

Secondary containment facilities shall be impervious to the materials stored there for a minimum contact time of 72 hours.

Throughout the rainy season secondary containment facilities shall be covered during non-working days and when precipitation is predicted. Secondary containment facilities shall be adequately ventilated.

The Contractor shall keep the secondary containment facility free of accumulated rainwater or spills. After precipitation, or in the event of spills or leaks, accumulated liquid shall be collected and placed into drums within 24 hours. These liquids shall be handled as hazardous waste in accordance with the provisions in "Hazardous Waste" of these special provisions, unless testing determines them to be nonhazardous.

Incompatible materials, such as chlorine and ammonia, shall not be stored in the same secondary containment facility.

Materials shall be stored in the original containers with the original product labels maintained in legible condition. Damaged or illegible labels shall be replaced immediately.

The secondary containment facility shall have the capacity to contain precipitation from a 24-hour-long, 25-year storm; and 10 percent of the aggregate volume of all containers, or all of the volume of the largest container within the facility, whichever is greater.

The Contractor shall store bagged or boxed material on pallets. Throughout the rainy season, bagged or boxed material shall be protected from wind and rain during non-working days and when precipitation is predicted.

The Contractor shall provide sufficient separation between stored containers to allow for spill cleanup or emergency response access. Storage areas shall be kept clean, well organized, and equipped with cleanup supplies appropriate for the materials being stored.

The Contractor shall repair or replace perimeter controls, containment structures, covers, and liners as needed. Storage areas shall be inspected before and after precipitation, and at least weekly during other times.

Stockpile Management

The Contractor shall reduce or eliminate potential air and water pollution from stockpiled material including soil, paving material, or pressure treated wood. Stockpiles shall be located out of floodplains when possible, and at least 50 feet from concentrated flows of storm water, drainage courses, or inlets unless written approval is obtained from the Engineer.

The Contractor may discontinue adding or removing material for up to 21 days and a stockpile will still be considered active.

The Contractor shall protect active stockpiles with plastic or geotextile cover, soil stabilization measures, or with linear sediment barrier when precipitation is predicted. Active stockpiles of cold mix asphalt concrete shall be placed on an impervious surface and covered with plastic when precipitation is predicted.

The Contractor shall protect inactive soil stockpiles with a plastic or geotextile cover, or with soil stabilization measures at all times during the rainy season. A linear sediment barrier around the perimeter of the stockpile shall also be used. During the non-rainy season soil stockpiles shall be covered and protected with a linear sediment barrier when precipitation is predicted. The Contractor shall control wind erosion during dry weather as provided in Section 10, "Dust Control," of the Standard Specifications.

Stockpiles of portland cement concrete rubble, ~~asphalt concrete (AC), hot mix asphalt (HMA), AC and HMA rubble,~~ aggregate base, or aggregate subbase shall be covered with plastic or geotextile, or protected with a linear sediment barrier at all times during the rainy season, and when precipitation is predicted during the non-rainy season.

~~Stockpiles of cold mix asphalt concrete shall be placed on and covered with impermeable material at all times during the rainy season, and when precipitation is predicted during the non-rainy season.~~

~~Stockpiles of pressure treated wood shall be covered with impermeable material and placed on pallets at all times during the rainy season, and when precipitation is predicted during the non-rainy season.~~

The Contractor shall repair or replace linear sediment barriers and covers as needed or as directed by the Engineer to keep them functioning properly. Sediment shall be removed when it accumulates to 1/3 of the linear sediment barrier height.

WASTE MANAGEMENT

Solid Waste

The Contractor shall not allow litter or debris to accumulate anywhere on the construction site, including storm drain grates, trash racks, and ditch lines. The Contractor shall pick up and remove trash and debris from the construction site at least once a week. The WPCM shall monitor solid waste storage and disposal procedures on the construction site. The Contractor shall provide enough dumpsters of sufficient size to contain the solid waste generated by the project. Dumpsters shall be emptied when refuse reaches the fill line. Dumpsters shall be watertight. The Contractor shall not wash out dumpsters on the construction site. The Contractor shall provide additional containers and more frequent pickup during the demolition phase of construction

Solid waste includes:

A. Brick,
B. Mortar,
C. Timber,
D. Metal scraps,
E. Sawdust,
F. Pipe,
G. Electrical cuttings,
H. Non-hazardous equipment parts,
I. Styrofoam and other packaging materials,
J. Vegetative material and plant containers from highway planting, and
K. Litter and smoking material, including litter generated randomly by the public.

Trash receptacles shall be provided and used in the Contractor's yard, field trailers, and locations where workers gather for lunch and breaks.

Hazardous Waste

The Contractor shall implement hazardous waste management practices when waste is generated on the construction site from the following substances:

A. Petroleum products,
B. Asphalt products,
C. Concrete curing compound,
D. Pesticides,
E. Acids,
F. Paints,
G. Stains,
H. Solvents,

I. Wood preservatives,
J. Roofing tar, and
K. Materials classified as hazardous by California Code of Regulations, Title 22, Division 4.5; or listed in CFR Title 40, Parts 110, 117, 261, or 302.

Nothing in these special provisions shall relieve the Contractor of the responsibility for compliance with Federal, State, and local laws regarding storage, handling, transportation, and disposal of hazardous wastes.

Hazardous material existing on the construction site before mobilization shall be handled and disposed of in accordance with ~~"_____" of these special provisions~~ applicable Federal, State, and local laws.

The WPCM shall oversee and enforce hazardous waste management practices. Production of hazardous materials and hazardous waste on the construction site shall be kept to a minimum. Perimeter controls, containment structures, covers, and liners shall be repaired or replaced when damaged.

The Contractor shall have a laboratory certified by the Department of Health Services (DHS) sample and test waste when hazardous material levels are unknown to determine safe methods for storage and disposal.

The Contractor shall segregate potentially hazardous waste from nonhazardous waste at the construction site. Hazardous waste shall be handled, stored, and disposed of as required in California Code of Regulations, Title 22, Division 4.5, Section 66262.34; and in CFR Title 49, Parts 261, 262, and 263.

The Contractor shall store hazardous waste in sealed containers constructed and labeled with the contents and date accumulated as required in California Code of Regulations, Title 22, Division 4.5; and in CFR Title 49, Parts 172, 173, 178, and 179. Hazardous waste containers shall be kept in temporary containment facilities conforming to the provisions in "Material Storage" of these special provisions.

There shall be adequate storage volume and containers shall be conveniently located for hazardous waste collection. Containers of hazardous waste shall not be overfilled and hazardous wastes shall not be mixed. Containers of dry waste that are not watertight shall be stored on pallets. The Contractor shall not allow potentially hazardous waste to accumulate on the ground. Hazardous waste shall be stored away from storm drains, watercourses, moving vehicles, and equipment.

The Contractor shall clean water based or oil based paint from brushes or equipment within a contained area and shall not contaminate soil, watercourses, or storm drain systems. Paints, thinners, solvents, residues, and sludges that cannot be recycled or reused shall be disposed of as hazardous waste. When thoroughly dry, latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths shall be disposed of as solid waste.

The Contractor shall dispose of hazardous waste within 90 days of being generated. Hazardous waste shall be disposed of by a licensed hazardous waste transporter using uniform hazardous waste manifest forms and taken to a Class I Disposal Site. A copy of the manifest shall be provided to the Engineer.

Contaminated Soil

The Contractor shall identify contaminated soil from spills or leaks by noticing discoloration, odors, or differences in soil properties. Soil with evidence of contamination shall be sampled and

tested by a laboratory certified by DHS. If levels of contamination are found to be hazardous, the soil shall be handled and disposed of as hazardous waste.

Contaminated soil existing on the construction site before mobilization shall be handled and disposed of in accordance ~~with "_____" of these special provisions~~ applicable Federal, State, and local laws.

The Contractor shall prevent the flow of water, including ground water, from mixing with contaminated soil by using one or a combination of the following measures:

A. Berms,
B. Cofferdams,
C. Grout curtains,
D. Freeze walls, or
E. Concrete seal course.

If water mixes with contaminated soil and becomes contaminated, the water shall be sampled and tested by a laboratory certified by the DHS. If levels of contamination are found to be hazardous, the water shall be handled and disposed of as hazardous waste.

Concrete Waste

The Contractor shall implement practices to prevent the discharge of portland cement concrete, AC, or HMA waste into storm drain systems or watercourses.

Portland cement concrete, AC, or HMA waste shall be collected at the following locations and disposed of:

A. Where concrete material, including grout, is used;
B. Where concrete dust and debris result from demolition;
C. Where sawcutting, coring, grinding, grooving, or hydro-concrete demolition of portland cement concrete, AC, or HMA creates a residue or slurry; or
D. Where concrete trucks or other concrete-coated equipment is cleaned at the construction site.

Sanitary and Septic Waste

Wastewater from sanitary or septic systems shall not be discharged or buried within the Department right of way. The WPCM shall inspect sanitary or septic waste storage and monitor disposal procedures at least weekly. Sanitary facilities that discharge to the sanitary sewer system shall be properly connected and free from leaks.

The Contractor shall obtain written approval from the local health agency, city, county, and sewer district before discharging from a sanitary or septic system directly into a sanitary sewer system, and provide a copy to the Engineer. The Contractor shall comply with local health agency requirements when using an on-site disposal system.

Liquid Waste

The Contractor shall not allow construction site liquid waste, including the following, to enter storm drain systems or watercourses:

A. Drilling slurries or fluids,

B. Grease-free or oil-free wastewater or rinse water,
C. Dredgings,
D. Liquid waste running off a surface including wash or rinse water, or
E. Other non-storm water liquids not covered by separate permits.

The Contractor shall hold liquid waste in structurally sound, leak proof containers such as:

A. Sediment traps,
B. Roll-off bins, or
C. Portable tanks.

Liquid waste containers shall be of sufficient quantity and volume to prevent spills and leaks. The containers shall be stored at least 50 feet from storm drains, watercourses, moving vehicles, and equipment.

The Contractor shall remove and dispose of deposited solids from sediment traps as provided in "Solid Waste" of these special provisions, unless determined infeasible by the Engineer.

Liquid waste may require testing to determine hazardous material content before disposal.

Drilling fluids and residue shall be disposed of outside the highway right of way. If the Engineer determines that an appropriate location is available, fluids and residue exempt under California Code of Regulations, Title 23, Section 2511(g) may be dried by infiltration and evaporation in a leak proof container. The remaining solid waste may be disposed of as provided in "Solid Waste" of these special provisions.

NON-STORM WATER MANAGEMENT

Water Control and Conservation

The Contractor shall prevent erosion or the discharge of pollutants into storm drain systems or watercourses by managing the water used for construction operations. The Contractor shall obtain the Engineer's approval before washing anything on the construction site with water that could discharge into a storm drain system or watercourse. Discharges shall be reported to the Engineer immediately.

The Contractor shall implement water conservation practices when water is used on the construction site. Irrigation areas shall be inspected and watering schedules shall be adjusted to prevent erosion, excess watering, or runoff. The Contractor shall shut off the water source to broken lines, sprinklers, or valves, and they shall be repaired as soon as possible. When possible, water from waterline flushing shall be reused for landscape irrigation. Paved areas shall be swept and vacuumed, not washed with water.

Construction water runoff, including water from water line repair, shall be directed to areas to infiltrate into the ground and shall not be allowed to enter storm drain systems or watercourses. Spilled water shall not be allowed to escape water truck filling areas. When possible, the Contractor shall direct water from off-site sources around the construction site, or shall minimize contact with the construction site.

Illegal Connection and Discharge Detection and Reporting

The Contractor shall inspect the construction site and the site perimeter before beginning work for evidence of illegal connections, discharges, or dumping. Subsequently, the construction site and perimeter shall be inspected on a frequent, predetermined schedule.

The Contractor shall immediately notify the Engineer when illegal connections, discharges, or dumping are discovered. The Contractor shall take no further action unless directed by the Engineer. Unlabeled or unidentifiable material shall be assumed to be hazardous.

The Contractor shall look for the following evidence of illegal connections, discharges, or dumping:

A. Debris or trash piles,
B. Staining or discoloration on pavement or soils,
C. Pungent odors coming from drainage systems,
D. Discoloration or oily sheen on water,
E. Stains or residue in ditches, channels or drain boxes,
F. Abnormal water flow during dry weather,
G. Excessive sediment deposits,
H. Nonstandard drainage junction structures, or
I. Broken concrete or other disturbances near junction structures.

Vehicle and Equipment Cleaning

The Contractor shall limit vehicle and equipment cleaning or washing on the construction site to that necessary to control vehicle tracking or hazardous waste. Vehicles and equipment shall not be cleaned on the construction site with soap, solvents, or steam until the Engineer has been notified. The resulting waste shall be contained and recycled, or disposed of as provided in "Liquid Waste" or "Hazardous Waste" of these special provisions, whichever is applicable. The Contractor shall not use diesel to clean vehicles or equipment, and shall minimize the use of solvents.

The Contractor shall clean or wash vehicles and equipment in a structure equipped with disposal facilities. If using a structure is not possible, vehicles and equipment shall be cleaned or washed in an outside area with the following characteristics:

A. Located at least 50 feet from storm drainage systems or watercourses,
B. Paved with AC, HMA, or portland cement concrete,
C. Surrounded by a containment berm, and
D. Equipped with a sump to collect and dispose of wash water.

When washing vehicles or equipment with water, the Contractor shall use as little water as possible. Hoses shall be equipped with a positive shutoff valve.

Wash racks shall discharge to a recycle system or to another system approved by the Engineer. Sumps shall be inspected regularly, and liquids and sediments shall be removed as needed.

Vehicle and Equipment Fueling and Maintenance

The Contractor shall fuel or perform maintenance on vehicles and equipment off the construction site whenever practical. When fueling or maintenance must be done at the construction site, the Contractor shall designate a site, or sites, and obtain approval from the Engineer before using. The fueling or maintenance site shall be protected from storm water, shall be on level ground, and shall be located at least 50 feet from drainage inlets or watercourses. The WPCM shall inspect the fueling or maintenance site regularly. Mobile fueling or maintenance shall be kept to a minimum.

The Contractor shall use containment berms or dikes around the fueling and maintenance area. Adequate amounts of absorbent spill cleanup material and spill kits shall be kept in the fueling and maintenance area and on fueling trucks. Spill cleanup material and kits shall be disposed of immediately after use. Drip pans or absorbent pads shall be used during fueling or maintenance unless performed over an impermeable surface.

Fueling or maintenance operations shall not be left unattended. Fueling nozzles shall be equipped with an automatic shutoff control. Vapor recovery fueling nozzles shall be used where required by the Air Quality Management District. Nozzles shall be secured upright when not in use. Fuel tanks shall not be topped-off.

The Contractor shall recycle or properly dispose of used batteries and tires.

Material and Equipment Used Over Water

Drip pans and absorbent pads shall be placed under vehicles or equipment used over water, and an adequate supply of spill cleanup material shall be kept with the vehicle or equipment. Drip pans or plastic sheeting shall be placed under vehicles or equipment on docks, barges, or other surfaces over water when the vehicle or equipment will be idle for more than one hour.

The Contractor shall provide watertight curbs or toe boards on barges, platforms, docks, or other surfaces over water to contain material, debris, and tools. Material shall be secured to prevent spills or discharge into water due to wind.

Structure Removal Over or Adjacent to Water

The Contractor shall not allow demolished material to enter storm water systems or watercourses. The Contractor shall use covers and platforms approved by the Engineer to collect debris. Attachments shall be used on equipment to catch debris on small demolition operations. Debris catching devices shall be emptied regularly and debris shall be handled as provided in "Waste Management" of these special provisions.

The WPCM shall inspect demolition sites within 50 feet of storm water systems or watercourses every day.

Paving, Sealing, Sawcutting, and Grinding Operations

The Contractor shall prevent the following material from entering storm drain systems or water courses:

A. Cementitious material,
B. Asphaltic material,
C. Aggregate or screenings,
D. Grinding or sawcutting residue,
E. Pavement chunks, or
F. Shoulder backing.

The Contractor shall cover drainage inlets and use linear sediment barriers to protect downhill watercourses until paving, sealing, sawcutting, or grinding operations are completed and excess material has been removed. Drainage inlets and manholes shall be covered during the application of seal coat, tack coat, slurry seal, or fog seal.

During the rainy season or when precipitation is predicted, paving, sawcutting, and grinding operations shall be limited to places where runoff can be captured. Seal coat, tack coat, slurry seal,

or fog seal operations shall not begin if precipitation is predicted for the application or the curing period. The Contractor shall not excavate material from existing roadways during precipitation.

The Contractor shall vacuum up slurry from sawcutting operations immediately after the slurry is produced. Slurry shall not be allowed to run onto lanes open to public traffic or off the pavement.

The Contractor shall collect residue from portland cement concrete grinding operations with a vacuum attachment on the grinding machine. The residue shall not be left on the pavement or allowed to flow across the pavement.

Material excavated from existing roadways may be stockpiled as provided in "Stockpile Management" of these special provisions if approved by the Engineer. AC or HMA chunks used in embankment shall be placed above the water table and covered by at least one foot of material.

Substances used to coat asphalt trucks and equipment shall not contain soap, foaming agents, or toxic chemicals.

~~**Thermoplastic Striping and Pavement Markers**~~

~~Thermoplastic striping and preheating equipment shutoff valves shall work properly at all times when on the construction site. The Contractor shall not preheat, transfer, or load thermoplastic within 50 feet of drainage inlets or watercourses. The Contractor shall not fill the preheating container to more than 6 inches from the top. Truck beds shall be cleaned daily of scraps or melted thermoplastic.~~

~~The Contractor shall not unload, transfer, or load bituminous material for pavement markers within 50 feet of drainage inlets or watercourses. All pressure shall be released from melting tanks before removing the lid to fill or service. Melting tanks shall not be filled to more than 6 inches from the top.~~

~~The Contractor shall collect bituminous material from the roadway after marker removal.~~

~~**Pile Driving**~~

~~The Contractor shall keep spill kits and cleanup material at pile driving locations. Pile driving equipment shall be parked over drip pans, absorbent pads, or plastic sheeting where possible. When not in use, pile driving equipment shall be stored at least 50 feet from concentrated flows of storm water, drainage courses, or inlets. The Contractor shall protect pile driving equipment by parking it on plywood and covering it with plastic when precipitation is predicted. The WPCM shall inspect the pile driving area every day for leaks and spills.~~

~~The Contractor shall use vegetable oil instead of hydraulic fluid when practical.~~

Concrete Curing

The Contractor shall not overspray chemical curing compound. Drift shall be minimized by spraying as close to the concrete as possible. Drainage inlets shall be covered before applying curing compound.

The Contractor shall minimize the use and discharge of water by using wet blankets or similar methods to maintain moisture when curing concrete.

Concrete Finishing

The Contractor shall collect and dispose of water and solid waste from high-pressure water blasting. Drainage inlets within 50 feet shall be covered before sandblasting. The nozzle shall be kept as close to the surface of the concrete as possible to minimize drift of dust and blast material. Blast residue may contain hazardous material.

Containment structures for concrete finishing operations shall be inspected for damage before each day of use and before predicted precipitation. Liquid and solid waste shall be removed from the containment structure after each work shift.

DEWATERING

Dewatering shall consist of discharging accumulated storm water, ground water, or surface water from excavations or temporary containment facilities. The Contractor shall discharge water within the limits of the project.

Dewatering discharge shall not cause erosion, scour, or sedimentary deposits that impact natural bedding materials.

The Contractor shall conduct dewatering activities in accordance with the Field Guide for Construction Dewatering available at:

http://www.dot.ca.gov/hq/construc/stormwater/manuals.htm

Before dewatering the Contractor shall submit a Dewatering and Discharge Plan to the Engineer in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications and "Water Pollution Control," of these special provisions. At a minimum, the Dewatering and Discharge Plan shall include the following:

A. A title sheet and table of contents;
B. A description of the dewatering and discharge operations detailing the locations, quantity of water, equipment, and discharge point;
C. The estimated schedule for dewatering and discharge (begin and end dates, intermittent or continuous);
D. Discharge alternatives such as dust control or percolation; and
E. Visual monitoring procedures with inspection log.

The Contractor shall not discharge storm water or non-storm water that has an odor, discoloration other than sediment, an oily sheen, or foam on the surface and shall notify the Engineer immediately upon discovery.

If water cannot be discharged within the project limits due to site constraints it shall be disposed of in the same manner specified for material in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

PAYMENT

Full compensation for complying with the requirements of the special provision shall be considered as included in the various contract items of work and no separate payment will be made therefor.

10-1.06 PRESERVATION OF PROPERTY

[District Specification – text modified from Balfour Road project [note to District –Possible text for deletion marked with strikethrough font.]]

Attention is directed to the provisions in Section 7-1.11, "Preservation of Property,' of the Standard Specifications and these special provisions.

Existing trees, shrubs and other plants, that are not to be removed as shown on the plans or specified elsewhere in these special provisions, and are injured or damaged or caused to fall by reason of the contractor's operations, shall be replaced by the Contractor as directed by the Engineer. The Engineer shall determine appropriate number, size and species of plants as restitution. The Contractor shall furnish, plant, and maintain the specified plants at his expense. The maintenance period shall be for three years from the date that the Agency accepts the contract as complete. Typical tree restoration requires trees to be replaced at a 3:1 ratio. This may vary depending on the size and species of the tree, shrub or other plants removed. In addition, the Contractor shall post a security cash bond in the amount of $2,000 plus an additional $200 per tree in excess of three trees, $100 per shrub, and an amount representing 10 times the actual cost of other plants replaced. This security bond will be returned at the end of the three-year maintenance period provided that an 80% survivability is reached with the replacement planting. Failure to reach this goal will require additional planting and another three-year maintenance period with appropriate security bond being retained by the County.

Replacement planting of injured or damaged trees, shrubs and other plants shall be completed not less than 20 working days prior to acceptance of the contract. Replacement plants shall be watered as necessary to maintain the plants in a healthy condition.

Damaged or injured plants shall be removed and disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications.

10-1.07 PROGRESS SCHEDULE (CRITICAL PATH)

[District Specification – text modified from Balfour Road project]

Section 8-1.04, "Progress Schedule," of the Standard Specification is superseded with the following:

Progress schedules will be required for this contract. Within 10 working days of the award of the contract the Contractor shall submit to the Engineer a baseline progress schedule. The baseline progress schedule shall utilize a Critical Path Method (CPM) network diagram that clearly shows sequence and duration of major construction activities, interim milestones or completion dates required in the contract, and the controlling operation or operations. The schedule shall not be handwritten nor drawn. The critical path shall be clearly delineated.

The baseline CPM progress schedule submitted by the Contractor shall have no more than 150 activities unless permitted otherwise by the Engineer, and shall show all major activities that define the critical path for significant portions of the work. Individual activities that are not significant in themselves and create a series of parallel paths, shall be grouped within major activities or combined to form a more general major activity. The actual number of activities in the CPM network shall, in the judgment of the Engineer, be sufficient to assure adequate planning of the project and to permit monitoring and evaluation of progress and the analysis of time impacts and not to primarily manage the various resources that may be used by the Contractor. Along with the network diagram the Contractor shall submit a tabular listing of the schedule activities, their dependency and precedence relationships, durations and performance sequence.

Major activities are defined as single activities or groups of activities that create a significant portion of the project due to location, related type of work, or common completion dates. Major activities shall have durations of not less than 5 nor more than 20 working days. Milestone or transitional activities may have durations of less than 5 days. Isolated major activities, concurrent or combined activities may have more than 20 working days when approved by the Engineer. A schedule will not be acceptable if it shows completion dates beyond the contract requirements for interim target dates, milestones or contract completion. The contract completion date shall be based on the working days designated in the contract and not on a proposed early completion shown in the schedule. The Contractor may propose a schedule which shows completion of the project earlier than the number of working days allowed. However, failure to meet the proposed early completion date shall not be a basis for Right of Way delay claims by the Contractor. The baseline schedule shall not attribute either negative float or lag to any activity.

The schedule submitted shall meet in all respects the time and order of work requirements of the contract. The work shall be executed in the sequence indicated in the accepted baseline schedule and subsequent accepted updates and revisions. The Contractor shall be responsible for assuring that all work sequences are logical and the network shows a coordinated plan for complete performance of the work. Failure of the Contractor to include any element of work required for the performance of the contract in the network shall not relieve the Contractor from completing all work within the time limit specified for completion of the contract. If the Contractor fails to define any element of work, activity or logic, and the omission or error is discovered by either the Contractor or the Engineer, it shall be corrected by the Contractor at the next scheduled monthly update or revision.

The Contractor shall allow 10 days for the Engineer to review and accept, reject or return for correction or clarification any schedule submitted.

The Contractor shall submit a revised CPM network within 5 days when requested by the Engineer, or when there is significant change in the Contractor's operations that will affect the critical path. These revisions shall be in addition to and separate from the regular required monthly updates.

Once the Engineer accepts a CPM progress schedule, the Contractor shall not artificially improve his progress or change the quantity of float in any part of the schedule by adding or deleting activities, revising schedule logic restraints or changing planned activity durations. The Contractor may improve his progress by performing sequential activities concurrently or by performing activities more quickly than planned. In the case of multiple critical paths, float generated by early completion of one or a sequence of activities will be considered in determining if that sequence of activities remains on the critical path.

An update is defined as a regular monthly review of the CPM schedule, as of the last monthly estimate, to incorporate actual progress to date by activity, any approved time adjustments and projected completion dates. A revision is defined as a change in the future portion of the schedule that modifies logic, adds or deletes activities, or alters activities, sequences or durations. Float is defined as the amount of time between the early start date and late start date, or the early finish date and the late finish date, of any activity or group of activities in the network. Float shall not be considered as time for the exclusive use of or benefit of either the Agency or the Contractor. It shall be considered as a resource available to both parties and shall not be used to the financial detriment of either party.

On or before the first calendar day of each month, the Contractor shall meet with the Engineer to review contract progress. The Contractor shall submit to the Engineer at the monthly progress

meeting both a written narrative report and an update of the CPM schedule. The report shall identify and discuss potential problem areas; current and anticipated delaying factors and their impact; actions taken or proposed; proposed changes in CPM schedule logic; out of sequence work; and any other topics related to job progress or scheduling. The Contractor shall update the most recent schedule to incorporate all current schedule information, including actual progress, approved adjustments of time and proposed changes in sequence and logic.

Progress status shall be evaluated by the activities on the critical path at the time of updating. If the current updated CPM schedule indicates that the contract progress is 5 days or more behind the planned schedule, as determined by the Engineer, the Contractor shall submit to the Engineer a revised CPM schedule and an explanation of corrective action taken or proposed by the Contractor to complete the project within the time specified. Negative float indicates the activities are behind schedule and positive float indicates status ahead of schedule.

If the Contractor or the Engineer considers that an approved or anticipated change will impact the critical path or contract progress, a schedule analysis and revised CPM schedule supporting the proposed adjustment of time shall be submitted to the Engineer for discussion, review and acceptance. All changes shall be shown as separate activities or groups of activities and entered into the relevant part of the accepted network schedule current at the time of change. If such a revision is not available, the Engineer may, at his option, construct and utilize the project as-built schedule, or other recognized method of delay impact analysis. In case of a deductive change reducing the quantity of work to be done under affected activities, the estimated duration of these activities shall be adjusted to reflect the reduced quantities of work. The Contractor shall submit a written report, describing the adjustments and reasons for the adjustments, and the impact of the changes.

The Engineer may use these and other information in evaluating the effect of the changes, delays, or time savings on the critical path and the accepted schedule current at the time to determine the applicable adjustment of time, if any, to any target date or completion date due to the changes, delays, or time savings.

Changes or delays that do not affect the controlling operation or operations on the critical path will not be considered as the basis for a time adjustment. Changes or delays that do affect the controlling operation or operations on the critical path will be considered in granting an extension of time for completion of the contract only if the total float is absorbed by the delay.

Full compensation for furnishing all labor, materials, tools, equipment, and incidentals; and for doing all the work involved in preparing, furnishing, updating, revising CPM progress schedules; as specified in these special provisions, and as directed by the Engineer shall be considered as included in the various items of work and no separate payment will be made therefor.

The District will retain an amount equal to 25 percent of the estimated value of the work performed during the first estimate period, in which the Contractor fails to submit a baseline, revised or updated CPM schedule, conforming to the requirements of this section, as determined by the Engineer. Thereafter; on subsequent successive estimate periods the percentage the Agency will retain will be increased at 25 percent per estimate period in which acceptable CPM progress schedules have not been submitted to the Engineer. Retentions for failure to submit acceptable CPM progress schedules shall be additional to all other retentions provided for in the contract. The retention for failure to submit acceptable CPM progress schedules will be released for payment on the next monthly estimate for partial payment following the date that acceptable CPM progress schedules are submitted to the Engineer.

10-1.08 OBSTRUCTIONS

[District Specification – text modified from York Street project – Needs to be updated]

Attention is directed to Section 8-1.10, "Utility and Non-Highway Facilities," and Section 15, "Existing Highway Facilities," of the Standard Specifications and these special provisions.

The Contractor shall notify the Engineer and the appropriate regional notification center for operators of subsurface installations at least 2 working days, but not more than 14 calendar days, prior to performing any excavation or other work close to any underground pipeline, conduit, duct, wire or other structure. Regional notification centers include, but are not limited to, the following:

Notification Center	Telephone Number
Underground Service Alert-Northern California (USA)	811

The Contractor shall protect in place all power poles and overhead and underground utility lines, unless specifically associated with structure or utility removal and after ccordination with and approval by the respective utility company has been received. Unless otherwise shown or specified in the Contract, the Contractor shall maintain in service all drainage, water, gas, sewer lines, power, lighting, telephone conduits, and any other surface or subsurface utility structure that may be affected by the Work. However, the Contractor, for convenience, may arrange with individual owners to temporarily disconnect service lines or other facilities along the line of the Work. The cost of disconnecting and restoring such utilities shall be borne by the Contractor. Contractor will be held responsible for any damage or interruption of service to underground or overhead utilities to remain.

The Contractor shall comply with the following requirements:

- Existing power distribution (PG&E) utilities shall be protected from damage resulting from the Contractor's operations. Contractor shall keep PG&E informed of Contractor's operations and avoid unplanned disruption to PG&E's operations. Contractor shall coordinate with and facilitate pole line removal and relocation by PG&E within the project limits. The Contractor shall take all necessary precautions to protect the existing overhead line and poles from damage.

- Existing Calpine gas pipeline within and outside the project boundary shall be protected from damage resulting from the Contractor's operations. Contractor's activities along the pipeline route shall be closely coordinated and communicated with Calpine. Contractor shall keep Calpine informed of Contractor's operations and avoid unplanned disruption to Calpine's operations. The Contractor shall notify Chris Delaney at (707) 374-1516, at least fifteen (15) working days in advance of construction operations within 20 feet of the pipeline route.
- Existing gas pipelines outside Contractor's work area shall be protected from damage resulting from the Contractor's operations. Existing concrete drainage lines outside and inside Contractor's work area shall be protected from damage resulting from the Contractor's operations. The Contractor shall take all necessary precautions to protect all buried lines from damage.
- Any damage resulting from the Contractor's operations shall be repaired by the Contractor or by the utility company at Contractor's request. Damaged utility or drainage piping shall be returned to the condition which existed prior to the damage and to the satisfaction of the Engineer and the utility company at no additional cost to the Owner.
- The Owner may deduct the estimated cost of repairing any damage created by the Contractor's operation from payments otherwise due to the Contractor until such time the Contractor makes the repairs to the Engineer's satisfaction. If repair work is not completed as expeditiously as possible, the Owner, at its option, may contract to have the repair work completed outside of contract with the cost thereof deducted from the contract.

~~The following utility facilities will be relocated during the progress of the contract. The Contractor shall notify the Engineer, in writing, prior to doing work in the vicinity of the facility. The utility facility will be relocated within the listed working days, as defined in Section 8-1.06, "Time of Completion," of the Standard Specifications, after the notification is received by the Engineer:~~

~~**East Bay Municipal Utilities District (EBMUD)**~~

~~Water valve covers that are located within the project limits will be adjusted to grade by EBMUD after the hot mix asphalt overlay is complete. Contractor shall make arrangements with E.B.M.U.D for coordination of the adjustment work. The Contractor shall notify Henrique Pinguel at (510) 287-0831, at least fifteen (15) working days in advance of construction operations that necessitate adjustments of these facilities.~~

~~**West County Wastewater District (W.C.W.D)**~~

~~Sanitary sewer manhole covers that are located within the project limits will be adjusted to grade by W.C.W.D. The Contractor shall make arrangements with W.C.W.D for coordination of the adjustment work. The Contractor shall notify Ajay Kataria at (510) 222-6700, at least fifteen (15) working days in advance of construction operations that necessitate adjustments of these facilities so that W.C.W.D. can order the manhole ring.~~

~~The Contractor shall notify Mr. Kataria again 48 hours prior to construction operations that necessitate adjustment of these facilities so that W.C.W.D.'s work can be coordinated with the Contractor's work~~

PAYMENT

Full compensation for coordinating and work regarding utility adjustment with utility companies shall be considered as included in the contract price paid for various contract items and no separate payment will be made therefore.

10-1.09 CONSTRUCTION AREA TRAFFIC CONTROL DEVICES

[District Specification – text from Balfour Road project]

Flagging, signs, and temporary traffic control devices furnished, installed, maintained, and removed when no longer required shall conform to the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Category 1 temporary traffic control devices are defined as small and lightweight (less than 100 pounds) devices. These devices shall be certified as crashworthy by crash testing, crash testing of similar devices, or years of demonstrable safe performance. Category 1 temporary traffic control devices include traffic cones, plastic drums, portable delineators, and channelizers.

If requested by the Engineer, the Contractor shall provide written self-certification for crashworthiness of Category 1 temporary traffic control devices at least 5 business days before beginning any work using the devices or within 2 business days after the request if the devices are already in use. Self-certification shall be provided by the manufacturer or Contractor and shall include the following:

A. Date,
B. Federal Aid number (if applicable),
C. Contract number, district, county, route and post mile of project limits,
D. Company name of certifying vendor, street address, city, state and zip code,
E. Printed name, signature and title of certifying person; and
F. Category 1 temporary traffic control devices that will be used on the project.

The Contractor may obtain a standard form for self-certification from the Engineer.

Category 2 temporary traffic control devices are defined as small and lightweight (less than 100 pounds) devices that are not expected to produce significant vehicular velocity change, but may cause potential harm to impacting vehicles. Category 2 temporary traffic control devices include barricades and portable sign supports.

Category 2 temporary traffic control devices shall be on the Federal Highway Administration's (FHWA) list of Acceptable Crashworthy Category 2 Hardware for Work Zones. This list is maintained by FHWA and can be located at:

http://safety.fhwa.dot.gov/roadway_dept/road_hardware/listing.cfm?code=workzone

The Department also maintains this list at:

http://www.dot.ca.gov/hq/traffops/signtech/signdel/pdf/Category2.pdf

Category 2 temporary traffic control devices that have not received FHWA acceptance shall not be used. Category 2 temporary traffic control devices in use that have received FHWA acceptance shall be labeled with the FHWA acceptance letter number and the name of the manufacturer. The label shall be readable and permanently affixed by the manufacturer. Category 2 temporary traffic control devices without a label shall not be used.

If requested by the Engineer, the Contractor shall provide a written list of Category 2 temporary traffic control devices to be used on the project at least 5 business days before beginning any work using the devices or within 2 business days after the request if the devices are already in use.

Category 3 temporary traffic control devices consist of temporary traffic-handling equipment and devices that weigh 100 pounds or more and are expected to produce significant vehicular velocity change to impacting vehicles. Temporary traffic-handling equipment and devices include crash cushions, truck-mounted attenuators, temporary railing, temporary barrier, and end treatments for temporary railing and barrier.

Type III barricades may be used as sign supports if the barricades have been successfully crash tested, meeting the NCHRP Report 350 criteria, as one unit with a construction area sign attached.

Category 3 temporary traffic control devices shall be shown on the plans or on the Department's Highway Safety Features list. This list is maintained by the Division of Engineering Services and can be found at:

http://www.dot.ca.gov/hq/esc/approved_products_list/

Category 3 temporary traffic control devices that are not shown on the plans or not listed on the Department's Highway Safety Features list shall not be used.

Full compensation for providing self-certification for crashworthiness of Category 1 temporary traffic control devices and for providing a list of Category 2 temporary traffic control devices used on the project shall be considered as included in the prices paid for the various items of work requiring the use of the Category 1 or Category 2 temporary traffic control devices and no additional compensation will be allowed therefor.

10-1.10 CONSTRUCTION AREA SIGNS

[District Specification – text from Balfour Road project]

Construction area signs for temporary traffic control shall be furnished, installed, maintained, and removed when no longer required in conformance with the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Attention is directed to "Furnish Sign" of these special provisions.

Attention is directed to the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions. Type II retroreflective sheeting shall not be used on construction area sign panels. Type III, IV, VII, VIII, or IX retroreflective sheeting shall be used for stationary mounted construction area sign panels.

Attention is directed to "Construction Project Information Signs" of these special provisions regarding the number and type of construction project information signs to be furnished, erected, maintained, and removed and disposed of.

Unless otherwise shown on the plans or specified in these special provisions, the color of construction area warning and guide signs shall have black legend and border on orange background, except W10-1 or W47(CA) (Highway-Rail Grade Crossing Advance Warning) sign shall have black legend and border on yellow background.

Orange background on construction area signs shall be fluorescent orange.

Repair to construction area sign panels will not be allowed, except when approved by the Engineer. At nighttime under vehicular headlight illumination, sign panels that exhibit irregular luminance, shadowing or dark blotches shall be immediately replaced at the Contractor's expense.

The Contractor shall notify the appropriate regional notification center for operators of subsurface installations at least 2 business days, but not more than 14 days, prior to commencing excavation for construction area sign posts. The regional notification centers include, but are not limited to, the following:

Notification Center	Telephone Number
Underground Service Alert	811

Excavations required to install construction area signs shall be performed by hand methods without the use of power equipment, except that power equipment may be used if it is determined there are no utility facilities in the area of the proposed post holes. The post hole diameter, if backfilled with portland cement concrete, shall be at least 4 inches greater than the longer dimension of the post cross section.

Construction area signs placed within 15 feet from the edge of the travel way shall be mounted on stationary mounted sign supports as specified in "Construction Area Traffic Control Devices" of these special provisions.

The Contractor shall maintain accurate information on construction area signs. Signs that are no longer required shall be immediately covered or removed. Signs that convey inaccurate information shall be immediately replaced or the information shall be corrected. Covers shall be replaced when they no longer cover the signs properly. The Contractor shall immediately restore to the original position and location any sign that is displaced or overturned, from any cause, during the progress of work.

The term "construction area signs" shall include temporary object markers required for the direction of public traffic through or around the work during construction. Object markers listed or designated on the plans as construction area signs shall be considered to be signs and shall be furnished, erected, maintained, and removed by the Contractor in the same manner specified for construction area signs.

Object markers shall be stationary mounted on wood or metal posts in conformance with the details shown on the plans and the provisions in Section 82, "Markers and Delineators," of the Standard Specifications.

Marker panels for Type N (CA), Type P (CA) and Type R (CA) object markers shall conform to the provisions for sign panels for stationary mounted signs.

Target plates for Type K (CA) and Type L (CA) object markers and posts, reflectors and hardware shall conform to the provisions in Section 82, "Markers and Delineators," but need not be new.

Note 4 in the first paragraph of Section 12-3.06A, "Stationary Mounted Signs," of the Standard Specifications is amended to read:

4. The post embedment shall be 2.5 feet backfill with native material. Compact by tamping.

Construction funding signs will be furnished by the County. The Contractor shall furnish two sign posts per sign and install the signs at the locations designated by the Engineer. The construction funding signs shall be placed in conjunction with construction area signs. These signs shall be maintained by the Contractor throughout the project construction. Damaged construction funding signs shall be replaced by the contractor at his/her expense. These signs shall be salvaged and returned to the County upon completion of the project. Signs shall be picked up and delivered to the County sign shop at 2475 Waterbird Way, Martinez, California, Monday through Thursday by appointment only. Call (925) 313-7000 a minimum of 48 hours in advance for appointment.

Full compensation for pickup, installing, maintaining, removing, salvaging and returning County furnished signs shall be considered as included in the contract lump sum price for construction area signs and no separate payment will be made therefor.

Payment for construction area signs will be made in increments of the contract lump sum price for this item of work in the following manner:

Initial Increment:	60 percent of the lump sum price upon satisfactory completion of installation of signs.
Final Increment:	Balance of the lump sum price upon satisfactory completion of removal of signs.

10-1.11 MAINTAINING TRAFFIC

[District Specification – text from Balfour Road project]

Attention is directed to Sections 7-1.08, "Public Convenience," 7-1.09, "Public Safety," and 12, "Construction Area Traffic Control Devices," of the Standard Specifications and to the provisions in "Public Safety" of these special provisions and these special provisions. Nothing in these special provisions shall be construed as relieving the Contractor from the responsibilities specified in Section 7-1.09.

Lane closures shall conform to the provisions in section "Traffic Control System for Lane Closure" of these special provisions.

No work that would require a lane closure shall be performed.

Personal vehicles of the Contractor's employees shall not be parked on the traveled way including any section closed to public traffic.

Personal vehicles of the Contractor's employees shall not be parked on the traveled way or shoulders including any section closed to public traffic.

The Contractor shall notify local authorities of the Contractor's intent to begin work at least 5 days before work is begun. The Contractor shall cooperate with local authorities relative to handling traffic through the area and shall make arrangements relative to keeping the working area clear of parked vehicles.

Local authorities are defined as, but not limited to, Contra Costa Sheriffs Department, California Highway Patrol, local Fire Department, United States Post Office, local waste management companies Emergency Response Companies and/or all businesses or regular users whose ability to perform their daily job will be affected by road closures, detours or general work by the Contractor.

When work vehicles or equipment are parked on the shoulder within 6 feet of a traffic lane, the shoulder area shall be closed with fluorescent orange traffic cones or portable delineators placed on a taper in advance of the parked vehicles or equipment and along the edge of the pavement at 25-foot intervals to a point not less than 25 feet past the last vehicle or piece of equipment. A minimum of 9 traffic cones or portable delineators shall be used for the taper. A W20-1 (ROAD WORK AHEAD) or W21-5b (RIGHT/LEFT SHOULDER CLOSED AHEAD) or C24(CA) (SHOULDER WORK AHEAD) sign shall be mounted on a crashworthy portable sign support with flags. The sign shall be placed where designated by the Engineer. The sign shall be a minimum of 48" x 48" in size. The Contractor shall immediately restore to the original position and location a traffic cone or delineator that is displaced or overturned, during the progress of work.

No construction equipment or construction materials shall be parked or stockpiled within 10 feet of a traffic lane along _____(Name Street) when construction operations are not actively in progress.

A minimum of one paved traffic lane, not less than _____feet wide, shall be open for use by public traffic in each direction of travel.

A minimum of one paved traffic lane, not less than _____feet wide, shall be open for use by public traffic. When construction operations are not actively in progress, not less than 2 of these lanes shall be open to public traffic.

During blasting hauling slide removal excavation operations, the road may be closed and public traffic stopped for periods not to exceed _____ hours _____ minutes. After each closure, accumulated traffic shall pass through the work before another closure is made.

No work that interferes with public traffic shall be performed between _____ a.m. and _____ a.m. or between _____ p.m. and _____ p.m. except work required under Sections 7-1.08 and 7-1.09 of the Standard Specifications and these special provisions.

The full width of the traveled way shall be open for use by public traffic on Saturdays, Sundays and designated legal holidays; after 3:00 p.m. on Fridays and the day preceding designated legal holidays; and when construction operations are not actively in progress.

Designated legal holidays are listed elsewhere in these special provisions.

The provisions in this section will not relieve the Contractor of responsibility for providing additional devices or taking measures as may be necessary to comply with the provisions in Section 7-1.09, "Public Safety," of the Standard Specifications.

11, 12,& 13 Use only when there are time restrictions on the Contractor's operationsLATE REOPENING OF CLOSURES

If a closure is not reopened to public traffic by the specified time, work shall be suspended in conformance with the provisions in Section 8-1.05, "Temporary Suspension of Work," of the Standard Specifications. The Contractor shall not make any further closures until the Engineer has accepted a work plan, submitted by the Contractor, that will insure that future closures will be reopened to public traffic at the specified time. The Engineer will have 2 working days to accept or

reject the Contractor's proposed work plan. The Contractor will not be entitled to any compensation for the suspension of work resulting from the late reopening of closures.

For each 10-minute interval, or fraction thereof past the time specified to reopen the closure, the Agency will deduct $_____ per interval from moneys due or that may become due the Contractor under the contract.

Minor deviations from the requirements of this section concerning hours of work which do not significantly change the cost of the work may be permitted upon the written request of the Contractor if, in the opinion of the Engineer, public traffic will be better served and the work expedited. These deviations shall not be adopted by the Contractor until the Engineer has approved the deviations in writing. Other modifications will be made by contract change order.

TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE

A traffic control system shall consist of closing traffic lanes and ramps in conformance with the details shown on the plans, the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications, the provisions under "Maintaining Traffic" and "Construction Area Signs" of these special provisions, and these special provisions.

During traffic stripe operations and pavement marker placement operations using bituminous adhesive, traffic shall be controlled, at the option of the Contractor, with either stationary or moving lane closures. During other operations, traffic shall be controlled with stationary lane closures. Attention is directed to the provisions in Section 84-1.04, "Protection From Damage," and Section 85-1.06, "Placement," of the Standard Specifications.

If components in the traffic control system are displaced or cease to operate or function as specified, from any cause, during the progress of the work, the Contractor shall immediately repair the components to the original condition or replace the components and shall restore the components to the original location.

STATIONARY LANE CLOSURE

When lane and ramp closures are made for work periods only, at the end of each work period, components of the traffic control system, except portable delineators placed along open trenches or excavation adjacent to the traveled way, shall be removed from the traveled way and shoulder. If the Contractor so elects, the components may be stored at selected central locations, designated by the Engineer within the limits of the highway right of way.

Each vehicle used to place, maintain and remove components of a traffic control system on multilane highways shall be equipped with a Type II flashing arrow sign which shall be in operation when the vehicle is being used for placing, maintaining or removing the components. Vehicles equipped with Type II flashing arrow sign not involved in placing, maintaining or removing the components when operated within a stationary type lane closure shall only display the caution display mode. The sign shall be controllable by the operator of the vehicle while the vehicle is in motion. The flashing arrow sign shown on the plans shall not be used on the vehicles which are doing the placing, maintaining and removing of components of a traffic control system and shall be in place before a lane closure requiring the sign's use is completed.

The 500 foot section of a lane closure, shown along lane lines between the 1000 foot lane closure tapers on the plans entitled "Traffic Control System for Lane Closures on Freeways and Expressways" and "Traffic Control System for Lane and Complete Closures on Freeways and Expressways" shall not be used.

The traffic cones shown to be placed transversely across closed traffic lanes and shoulders on the plans entitled "Traffic Control System for Lane Closures on Freeways and Expressways" and "Traffic Control System for Lane and Complete Closures on Freeways and Expressways" shall not be placed.

MOVING LANE CLOSURE

Flashing arrow signs used in moving lane closures shall be truck-mounted. Changeable message signs used in moving lane closure operations shall conform to the provisions in Section 12-3.12, "Portable Changeable Message Signs," of the Standard Specifications, except the signs shall be truck-mounted and the full operation height of the bottom of the sign may be less than 7-feet above the ground, but should be as high as practicable.

Flashing arrow signs shall be in the caution display mode when used on 2-lane, 2-way highways.

Truck-mounted attenuators (TMA) for use in moving lane closures shall be any of the following approved models, or equal:

A. Hexfoam TMA Series 3000, Alpha 1000 TMA Series 1000 and Alpha 2001 TMA Series 2001, manufactured by Energy Absorption Systems, Inc., One East Wacker Drive, Chicago, IL 60601-2076, Telephone (312) 467-6750.

   1. Distributor (Northern): Traffic Control Service, Inc., 8585 Thys Court, Sacramento, CA 95828, Telephone 1-800-884-8274, FAX (916) 387-9734.
   2. Distributor (Southern): Traffic Control Service, Inc., 1881 Betmor Lane, Anaheim, CA 92805, Telephone 1-800-222-8274.

B. Cal T-001 Model 2 or Model 3, manufacturer and distributor: Hexcel Corporation, 11711 Dublin Boulevard, P.O. Box 2312, Dublin, CA 94568, Telephone (510) 828-4200.

C. Renco Rengard Model Nos. CAM 8-815 and RAM 8-815, manufacturer and distributor: Renco Inc., 1582 Pflugerville Loop Road, P.O. Box 730, Pflugerville, TX 78660-0730, Telephone 1-800-654-8182.

Each TMA shall be individually identified with the manufacturer's name, address, TMA model number, and a specific serial number. The names and numbers shall each be a minimum ½ inch high and located on the left (street) side at the lower front corner. The TMA shall have a message next to the name and model number in ½ inch high letters which states, "The bottom of this TMA shall be _____inches _____ ± inches above the ground at all points for proper impact performance." Any TMA which is damaged or appears to be in poor condition shall not be used unless recertified by the manufacturer. The Engineer shall be the sole judge as to whether used TMAs supplied under this contract need recertification. Each unit shall be certified by the manufacturer to meet the requirements for TMA in conformance with the standards established by the Transportation Laboratory.

Approvals for new TMA designs proposed as equal to the above-approved models shall be in conformance with the procedures (including crash testing) established by the Transportation Laboratory. For information regarding submittal of new designs for evaluation contact: Transportation Laboratory, 5900 Folsom Boulevard, Sacramento, California 95819.

New TMAs proposed as equal to approved TMAs or approved TMAs determined by the Engineer to need recertification shall not be used until approved or recertified by the Transportation Laboratory.

TRAFFIC CONTROL FOR MARKING PAVEMENT AREAS

The Contractor shall provide traffic control when the Engineer is scheduled to mark out dig-out and areas to be reconstructed.

A traffic control system shall consist of closing traffic lanes in conformance with the details shown on the plans, the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications, the provisions under "Maintaining Traffic" and "Construction Area Signs" of these special provisions, and this special provision.

Full compensation for providing traffic control to allow the Engineer to mark pavement areas, including all materials, signing, devices and labor shall be considered as included in the contract price paid for various items of work and no additional compensation will be made therefore.

TRAFFIC CONTROL FOR PAVEMENT DELINEATION

During traffic stripe operations and pavement marker placement operations using bituminous adhesive, traffic shall be controlled, at the option of the Contractor, as provided for under "Traffic Control System for Lane Closure" of these Special Provisions, or by use of an alternate traffic control plan proposed by the Contractor. The Contractor shall not start traffic stripe operations using an alternate plan until he has submitted his plan to the Engineer and has received written approval of said plan. Alternate traffic control plans for striping operations shall conform to the provisions in Section 7-1.08, "Public Convenience," 7-1.09, "Public Safety," and 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Full compensation for providing traffic control for applying traffic stripes and pavement markers shall be considered as included in the contract prices paid for the various items of work and no separate payment will be made therefor.

FLAGGING COSTS

In lieu of the provisions of Section 12-2.02, "Flagging Costs," of the Standard Specifications regarding equal payment by the State and the Contractor, full compensation for furnishing flaggers, including transporting flaggers, providing stands or towers for use of flaggers, shall be considered as included in the contract price paid for the various items of work that require flagging and no separate payment will be made therefor.

PORTABLE CHANGEABLE MESSAGE SIGN

Portable changeable message sign shall be furnished, placed, operated, and maintained at those locations shown on the plans or where designated by the Engineer in conformance with the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions. Messages displayed on the portable changeable message signs shall be as specified on the plans, or as directed by the Engineer and shall conform to Section 12-3.12 "Portable Changeable Message Signs," of the Standard Specifications and "Maintaining Traffic" of these special provisions."

The text of the message displayed on the portable changeable message sign must not scroll, or travel horizontal or vertically across the face of the message panel.

Continuously repeat the entire message in no more than 2 phases of at least 3 seconds per phase.

Place portable changeable message sign as far from the traveled way as practicable where it is legible to traffic and does not encroach on the traveled way. Place portable changeable sign before or at the crest of vertical roadway curvature where it is visible to approaching traffic. Avoid placing portable changeable message sign within or immediately after horizontal roadway curvature. Where possible, place portable changeable message sign behind guardrail or temporary railing (Type K).

Two portable changeable message signs, one on each side of the project limits, shall be placed as far in advance of the project limits as possible, and a minimum of seven (7) calendar days prior to the start of work. Two additional portable changeable message signs accompany the paving operation as the work proceeds. Exact messaging shall be approved by the Engineer.

A portable changeable message sign shall be placed in advance of the first warning sign for each stationary lane closure.

A portable changeable message sign shall be placed before and during ramp and connector closures.

A portable changeable message sign shall be placed during speed zone reductions. When used in conjunction with a lane closure, use one portable changeable message sign, with both the speed zone reduction and the lane closure messages.

PAYMENT

The contract unit price paid for portable changeable message sign shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all the work involved in providing _____ portable changeable message signs on a weekly basis complete in place, including providing message sign, providing power source, operating, maintaining, modifying message as directed, transporting from location to location, removing, and repairing or replacing defective or damaged portable changeable message sign, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract lump sum price paid for portable changeable message signs shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all the work involved in furnishing, placing, operating, modifying messages, maintaining, repairing, transporting from location to location, removing, and repairing or replacing defective or damaged portable changeable message signs, complete in place as specified in the Standard Specifications and these special provisions, as shown in the plans and as directed by the Engineer.

Portable changeable message signs ordered by the Engineer in excess of the number shown on the plans or specified in these special provisions will be paid for as extra work under Section 4-1.03D, "Extra Work," of the Standard Specifications.

The contract lump sum price paid for traffic control system shall include full compensation for furnishing all labor, materials (including signs), tools, equipment, and incidentals, and for doing all the work involved in placing, removing, storing, maintaining, moving to new locations, replacing and disposing of the components of the traffic control system shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The adjustment provisions in Section 4-1.03, "Changes," of the Standard Specifications shall not apply to the item of traffic control system. Adjustments in compensation for traffic control system will be made only for increased or decreased traffic control system required by changes ordered by the Engineer and will be made on the basis of the cost of the increased or decreased traffic control necessary. The adjustment will be made on a force account basis as provided in Section 9-1.03, "Force Account Payment," of the Standard Specifications for increased work and estimated on the same basis in the case of decreased work.

10-1.12 DUST CONTROL

[District Specification – GEI draft assuming that dust palliatives cannot be used. Needs District review.]

Dust control shall conform to the provisions in Section 10, "Dust Control" of the Standard Specifications and these special provisions.

Dust control shall be performed using water only. Dust palliatives shall not be used unless approved in writing by the Engineer. Prior to acceptance of dust palliatives by the Engineer the Contractor must demonstrate to the satisfaction of the Engineer that the dust palliative is biodegradable and will not contaminate the site or local waterways.

PAYMENT

Full compensation for complying with the requirements of the special provision shall be considered as included in the various contract items of work and no separate payment will be made therefor.

10-1.13 CONTRACTOR QUALITY CONTROL AND TESTING

[District and GEI Specification – text modified from other GEI project]

Testing shall comply with the requirements of Section 6-3, "Testing" of the Standard Specifications, except that in the first sentence of the first paragraph of 6-3.01 "General" replace the word "Engineer" with "Contractor" and that the second sentence of the first paragraph of 6-3.02 "Testing by the Contractor" shall be modified to read "When the test method for quality control testing is not specified by the Engineer, the test method used for quality control testing shall be as determined by the Contractor." The Contractor is responsible for the quality of the material and the quality of the work, and the Contractor may elect to perform testing in addition to that required by the specifications. No additional compensation shall be made for testing not required by these specifications.

Attention is directed to Section 6-3.02, "Testing by Contractor," of the Standard Specifications regarding responsibility for quality control. The acceptance testing performed by the District or the

Engineer shall not relieve the Contractor of responsibility for performing quality control testing as required by the above and other provisions of the Standard Specifications and these special provisions.

GENERAL

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with Standard Specifications and these special provisions. The Contractor shall implement Contractor Quality Control (CQC) as defined herein. The CQC system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction design and construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence. The site project superintendent will be held responsible for the quality of work on the job and is subject to removal by the Engineer for non-compliance with the quality requirements specified in the contract. The site project superintendent, in this context, shall be the highest level manager responsible for the overall construction activities at the site, including quality and production. The site project superintendent shall maintain a physical presence at the site at all times, except as otherwise acceptable to the Engineer, and shall be responsible for all construction and construction related activities at the site.

The Contractor shall designate a CQC Manager, meeting the requirements specified herein, who shall report to the site project superintendent. The site project superintendent shall not be the CQC manager. The CQC Manager shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. This CQC Manager shall be on the site at all times during construction. The CQC Manager shall be assigned as such but may have other duties.

Each day the CQC Manager will submit a Daily CQC Report to the Engineer. The Daily CQC Report will document all CQC activities and results of tests performed on that day as specified in the Standard Specifications and these special provisions.

CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, including that of subcontractors and suppliers, complies with the requirements of the Contract. At least three phases of control shall be conducted by the CQC Manager for each definable feature of the work as follows:

Preparatory Phase

The Preparatory Phase shall be performed on each definable feature of work prior to beginning the work, but after all required plans/documents/materials are approved/accepted and after copies of the plans/documents/materials are at the work site. This phase shall include:

A. Review of each paragraph of applicable specifications, reference codes, and standards applicable to that portion of the definable feature of work to be accomplished in the field. A copy of applicable sections of referenced codes and standards shall be made available by the Contractor. These copies shall be maintained in the field and available for use by Engineer until final acceptance of the work.
B. Review of the Contract Drawings.
C. Check to assure that all materials and/or equipment have been tested, submitted, and approved.
D. Review of provisions that have been made for required control, inspection, and testing.

E. Examine the work area to assure that all required preliminary work has been completed and is in compliance with the contract.
F. Physically examine required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.
G. Review of procedures for controlling quality of the work including identifying and avoiding repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.
H. Check to ensure that the portion of the CQC Plan for the work to be performed has been accepted by the Engineer.
I. Notify the District at least 24 hours in advance of beginning the Preparatory Phase. The Preparatory Phase shall include a Preparatory Phase Meeting conducted by the CQC Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature of work. The results of the Preparatory Phase Meeting shall be documented by separate minutes prepared by the CQC Manager and attached to the daily CQC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet the Contract Specifications.

Initial Phase

The Initial Phase shall be accomplished at the beginning of each definable feature of work. The following shall be accomplished:

A. Check prior work to ensure that it is in full compliance with contract requirements. Review minutes of the Preparatory Phase Meeting.
B. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.
C. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.
D. Review the safety plan and safety requirements with each worker.
E. Notify the Engineer at least 24 hours in advance of beginning the Initial Phase. The Initial Phase shall include an Initial Phase Meeting conducted by the CQC Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature of work. The results of the Inital Phase Meeting shall be documented by separate minutes prepared by the CQC Manager and attached to the daily CQC report.
F. The Initial Phase Meeting shall be repeated for each new crew to work onsite or any time specified quality standards are not being met.

Follow-up Phase

Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with contract requirements until completion of the particular definable feature of work. The checks shall be made part of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work that may be affected by the deficient work. The Contractor shall not build upon nor conceal non-conforming work.

Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same definable features of work if: the quality of on-going work is unacceptable; if there are changes in the applicable CQC staff, onsite production supervision, or work crew; if work on a definable feature is resumed after a substantial period of inactivity; or if other problems develop.

CONTRACTOR QUALITY CONTROL PLAN

The Contractor shall furnish a Contractor Quality Control (CQC) Plan for review by the Engineer not later than 15 Calendar Days after receipt of Notice to Proceed. The plan shall identify personnel, procedures, control, instructions, tests, records, and forms to be used. The Engineer will consider an interim plan for the first 15 Calendar Days of operation. Construction will be permitted to begin only after Engineer acceptance of the CQC Plan or Engineer acceptance of an interim plan applicable to the particular feature of work to be started. Outside of the features of work included in an accepted interim plan, work will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started.

Before start of construction, and prior to District acceptance of the CQC Plan, the Contractor shall meet with the Engineer and discuss the CQC Plan. The CQC Plan shall be submitted for review at least 5 Working Days prior to the Coordination Meeting. During the meeting, a mutual understanding of the CQC details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the District's Quality Assurance and testing activities. Minutes of the meeting shall be prepared by the Engineer and signed by both the Contractor and the Engineer. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

At a minimum, the CQC Plan shall include the following to cover all onsite and offsite design and construction operations performed by the Contractor, subcontractors, fabricators, suppliers, and purchasing agents:

A. A description of the quality control organization, including a chart showing lines of authority.

B. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function including the CQC Manager. The CQC Manager, identified by the Contractor, shall be an individual within the onsite work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC Manager shall be a graduate engineer, graduate architect, or a graduate of construction management, with a minimum of 10 years construction experience in construction of projects similar to the work undertaken in this Contract. An alternate for the CQC Manager shall be identified in the CQC Plan to serve in the event of the CQC Manager's absence. The requirements for the alternate shall be the same as for the designated CQC Manager.

C. A copy of a letter to the CQC Manager, signed by an authorized official of the Contractor, which describes the responsibilities of the CQC Manager and delegates sufficient authority to the CQC

Manager to adequately perform the functions of the CQC Manager, including authority to stop work that is not in compliance with the contract. The CQC Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters shall also be furnished in the CQC Plan.

D. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents.

E. Control, verification, and acceptance testing procedures for each specific test. Include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. Laboratory facilities shall be approved by the Engineer.

F. Procedures for tracking preparatory, initial, and follow-up control phases and for tracking control, verification, and acceptance tests including documentation.

G. Procedures for tracking construction deficiencies from identification of deficiency through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected.

H. Reporting procedures, including all proposed CQC forms, daily CQC reports, and other reporting formats.

I. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks and has separate control requirements. A definable feature of the work may be identified by different trades or disciplines or may be work by the same trade in a different environment. Each section of the special provisions may generally be considered as a definable feature of work, but there may be more than one definable feature under a particular section. The list of definable features of work will be agreed upon during the coordination meeting.

TESTING

When questionable material is indicated by tests, required in the specifications or by other basis, the Engineer may require additional testing. The Contractor shall pay for such additional testing and no additional compensation shall be made. If questionable material or rejected material has been used in the work performed, the Contractor shall remove such material in the work performed or reconstruct the work as directed by the Engineer at no extra expense to the District. The Engineer's decision in such matters will be final.

All rejected materials shall be removed from the work site at no extra expense to the District. No compensation will be made for rejected materials, their removal, or disposal.

TESTING PROCEDURE

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, the Contractor shall furnish duplicate samples of test specimens to the District for possible testing by the District. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of an Engineer-approved testing laboratory or establish an approved

testing laboratory at the project site. The Contractor shall perform the following activities and provide documentation that all tests and related activities have been completed.

A. Verify that testing procedures comply with contract requirements.
B. Verify that facilities and testing equipment are available and comply with testing standards.
C. Check test instrument calibration data against certified standards.
D. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
E. Provide results of all tests taken, both passing and failing tests, in the Daily CQC report for the date taken. Provide the specification paragraph reference, location where tests were taken, and the sequential control number identifying the test. If approved by the Engineer, actual test reports may be submitted later with a reference to the test number and date taken. An informational copy of tests performed by an offsite or commercial test facility shall be provided to the Engineer. Failure to submit timely test reports may result in nonpayment for related work performed and disapproval of the test facility for this contract.

The District reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the Specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils shall meet criteria detailed in ASTM D 3740 and ASTM E 329.

The District reserves the right to utilize the Contractor's control testing laboratory and equipment to make verification and acceptance tests and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the District.

Costs incidental to the transportation of samples or materials shall be borne by the Contractor. Samples of materials for verification and acceptance testing by the District shall be delivered to the District.

Whenever a reference is made in the Standard Specifications or these special provisions to any of the California Test numbers specified below, the corresponding ASTM Designation or AASHTO Designation test numbers may be used to determine the quality of materials.

CALIFORNIA TEST	ASTM DESIGNATION	AASHTO DESIGNATION
216	D 1557	T 180
231	D 2922 (a)	T 238 (a)
203	D 422	T 88
204	D 4318	T 89 & T 90
504	C 231	T 152
518	C 138	T 121
521	C 39	T 22
523	C 392 & C 78	T 177 & T 97
533	C 360	--

211	C 131 & C 535	T 96

Note:

(a) When ASTM Designation: D 2922 or AASHTO Designation: T 238 is used, the frequency and areal distribution of such tests shall comply with the requirements specified in California Test 231. For each determination of relative compaction by ASTM or AASHTO test methods, laboratory compaction tests per ASTM Designation: D 1557 or AASHTO Designation: T 180 shall be performed, except when the use of previous laboratory maximum dry densities are allowed. Previous laboratory maximum dry densities may be used to determine relative compaction if the material, as determined by the Engineer, is from the same general excavation or plant source and has the same visual characteristics of color, gradation, and soil classification as the previous laboratory maximum dry densities. The use of previous laboratory maximum dry densities will not be permitted for more than 5 working days or for more than 14 determinations of relative compaction.

SPECIFIC TESTING REQUIREMENTS

The Contractor shall be responsible for full compliance with the specifications in the performance of tests and the preparation, submittal, and maintenance of test results listed in the Contract and the Contractor's Quality Control Plan. Each test shall be started and completed without delay, and payment for materials placed, as well as for any subsequent construction dependent upon these materials, will not be authorized until final test reports showing compliance with these specifications have been properly distributed.

Minimum Testing Requirements

The Contractor shall perform sufficient testing to ensure that the work is being constructed as specified. The testing requirements provided in the specifications shall be considered the minimum acceptable. This does not relieve the Contractor from the responsibility of performing additional testing to ensure compliance with the specifications.

Failing Tests

The results of both passing and failing test results shall be recorded and reported to the Engineer. If failing test occurs, the Contractor shall take corrective actions necessary to correct the work so that it meets the requirements of the specifications. The Contractor shall record the date, time, and location of the failing test and the action taken to correct that portion of the work. The Contractor shall retest the work after corrections are taken to demonstrate that the work meets the requirements of these specifications. Test data for retesting shall be designated as retests. All failing tests and retests shall be documented in the Daily CQC Report.

Reporting

A. Copies of each test result shall be prepared with all necessary data recorded, documentation prepared, and computations completed. Distribution of the final copies of each test result shall be made to the Engineer with the Daily CQC Reports within 24 hours after collecting the laboratory test samples or initiating the field test, except when the required test duration exceeds 24 hours. When the test duration exceeds 24 hours, distribution of the final test results shall be within 24 hours after completion of the test.
B. All test forms shall be accurately completed. Test forms received by the Engineer that are not accurately completed will be immediately returned to the Contractor for correction or completion.

C. All quality control test forms must be signed by the Laboratory Manager and the CQC Manager. Unsigned quality control (QC) tests will not be accepted.
D. The horizontal and vertical locations of all QC field tests and QC samples collected for laboratory testing shall be determined to the nearest foot (1.0 ft.). Where applicable, the location of all field tests and laboratory test samples shall be determined with respect to the contract stationing. If stationing is not available for a portion of the work, the location of all field and laboratory test samples shall be determined with respected to the project horizontal and vertical datum. The Contractor shall prepare and maintain a test location plan, which shall be submitted to the Engineer when requested.
E. The laboratory QC test samples and field tests shall have a sequential numbering system as approved by the Engineer. The Contractor shall maintain a Materials Test Log, summarizing all QC field and laboratory testing, including failed test results, and the results of the QC tests compared to the specification requirements.
F. For failing test results, the Materials Test Log shall include a description of the corrective actions taken and the results of tests performed after corrective action is taken. The Material Test Log shall be maintained at the Contractor's project office, submitted to the Engineer on a weekly basis, and made available to the Engineer upon request. In addition, a copy of the Materials Test Log and the summary of test results shall be submitted with the monthly progress report for determining the Contractor's progress payment for materials placement represented by these tests.

MEASUREMENT

Not applicable.

PAYMENT

Full compensation for complying with all the conditions and requirements for Testing set forth in the specifications shall be considered as included in various items of work. No separate payment will be made therefor.

10-1.14 DISPOSAL OF MATERIALS

[District Specification – possible text adapted from other GEI project]

The District has not made arrangements for disposal of material. All excess and unsuitable material other than soil shall be disposed of by the Contractor in accordance with Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications, except that written permission of the Engineer for disposal of material will not be required. Where reference is made to "Highway Right-of-Way," it shall be understood to mean District right-of-way and easements.

Full compensation for all costs involved in disposing of materials as specified herein and in Section 7-1.13 of the Standard Specifications, including all costs of permits, documentation, hauling, and disposal shall be considered included in the price bid for the contract item involving such materials and no additional compensation shall be allowed therefor.

10-1.15 HAUL ROADS, ACCESS ROADS, AND TEMPORARY CHANNEL CROSSINGS

[District Specification – possible adapted from other GEI project]

Construction of haul roads, access roads, temporary channel crossings, and other roads for haul roads and access roads shall conform to the plans and these special provisions.

DESCRIPTION

Haul roads shall be located and constructed as required for the Work and for safety. Location, grade, width, and alignment of construction roads and haul roads shall be subject to approval by the Engineer. Haul roads shall be limited to the approved existing access roads shown on the plans, areas within the limits of work, and any additional routes approved by the District or shown on the plans. The limits of the haul roads shall be clearly marked in the field using construction fencing or similar methods approved by the Engineer. Haul roads shall be constructed to maintain the intended traffic, be free draining, and be maintained in good condition throughout the contract period.

Any haul road which crosses any creek or drainage channel shall be constructed, and maintained by the Contractor so as to not flood upstream areas by restricting stream flows or flood downstream areas by the release of any stored water in the event that the crossing fails for any cause. Culvert inverts shall be placed at the invert of the stream channel. Culvert diameter shall be as approved by the Engineer but not less than 60 inches. Channel crossings shall be removed at the earliest of the completion of the work necessitating the crossing or October 15. Upon removal of the channel crossings Contractor shall restore the channel invert and side slopes to the pre-existing condition.

Haul roads shall be constructed with suitable grades and widths and to avoid sharp curves, blind corners, and dangerous cross traffic. The Contractor shall provide necessary lighting, signs, barricades, and distinctive markings for the safe movement of traffic. The method of dust control shall be adequate to ensure safe operation at all times. Lighting shall be adequate to assure full and clear visibility for full width of haul road and work areas during any night work operations. Haul roads designated by the Engineer shall be removed after work is completed and the impacted areas restored to their preconstruction conditions.

The Contractor shall investigate the adequacy and the allowable load limit of existing roads. The Contractor shall, at its own expense, improve existing access roads and construct new access and haul roads necessary for proper prosecution of the work under this contract.

Existing roads that are used by the Contractor as haul and/or access roads shall be maintained at pre-construction condition or better throughout the contract period. The Contractor shall be responsible for the repair of any damage to roads, gates, fences, cattle crossings or the surrounding area caused by construction operations. The Contractor shall survey profiles and cross-sections and make videos of the portions of existing roads that will be used by the Contractor as access or haul roads. The surveyed profiles and cross-sections and the video documentation shall be submitted to the Engineer at least two weeks prior to use of the existing roads. A second set of surveyed profiles and cross-sections and video documentation of the roads used shall be made and submitted to the Engineer within two weeks after completion of the construction and road restoration work. The survey and video shall demonstrate that the condition of the roads after construction are at pre-construction condition or better, defined as follows:

- Road grade not lower than at pre-construction, per survey profile.
- Road width not less than at pre-construction, per surveyed cross-sections.
- Road surfacing in equal or better condition than at pre-construction, per video documentation.
- Gates, fences, and cattle crossings in equal or better condition than at pre-construction, per video documentation.

PAYMENT

Full compensation for complying with the requirements of the special provision shall be considered as included in the various contract items of work and no separate payment will be made therefor.

10-1.16 EXISTING FACILITIES

[District Specification – possible text adapted from other GEI project]

The work performed in connection with various existing facilities shall conform to the provisions in Section 15, "Existing Highway Facilities," of the Standard Specifications and these special provisions.

Miscellaneous highway facilities shall include any improvement or facility located within the area of work.

The Contractor shall request permission from the District to remove all existing facilities that are within the limits of work, are not designated on the plans to be protected in place or removed by others, and are in conflict with the work to be done. The Contractor shall not remove or damage these facilities until receipt of approval by the District.

Except as otherwise provided for damaged materials in Section 15-2.04, "Salvage," of the Standard Specifications, the materials to be salvaged shall remain the property of the District, and shall be cleaned, packaged, bundled, tagged, and hauled to the District recycle center at the Contra Costa County Maintenance Division Corporation Yard, 2475 Waterbird Way, Martinez, California, and stockpiled. Materials may be delivered to the recycle center Monday through Thursday, by appointment only. Call (925) 313-7000 a minimum of 48 hours in advance for appointment.

GENERAL

Existing facilities for removal shall include existing structures, drainage facilities, debris piles, piezometers, asphalt concrete paving, and other structures or facilities within the limits of clearing and grubbing that conflict with the work to be done or as shown on the project plans to be destroyed or removed.

The District has not made arrangements for disposal of material. All excess and unsuitable material other than soil shall be disposed of by the Contractor in accordance with Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications, except that written permission of the Engineer for disposal of material will not be required. Where reference is made to "Highway Right-of-Way," it shall be understood to mean District right-of-way and easements.

Do not begin demolition until authorization is received from the Engineer. Remove rubbish and debris from the project site and do not allow accumulation of such material. The work includes demolition, salvage of identified items and materials, and removal of resulting rubbish and debris. Contractor shall demolish existing items as shown on the project plans and as indicated by the Engineer. Rubbish and debris shall be removed from the project site daily, unless otherwise directed, to avoid accumulation at the demolition site. Materials that cannot be removed daily shall be stored in areas approved by the Engineer in a manner that prevents dispersal of the materials. In the interest of conservation, salvage shall be pursued to the maximum extent possible, and salvaged

items and materials shall be disposed of as specified. ***[District – are there requirements for salvaging materials?]***

During the demolition work the Contractor shall continuously evaluate the condition of the structure being demolished and take immediate action to protect all personnel working in and around the demolition site. No element will be allowed to be left standing without sufficient bracing, shoring, or lateral support to prevent collapse or failure while workmen remove debris or perform other work in the immediate area.

Prevent the spread of dust and debris to adjacent areas and properties and avoid the creation of a nuisance or hazard in the surrounding area. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, flooding or pollution. Sweep pavements as often as necessary for safety and to control the spread of debris.

Excavations for removal of existing facilities shall be backfilled as follows:

A. Excavations beneath within the main dam foundation, saddle dike foundation, inlet and outlet structure foundations, and spillway foundation shall be filled with Zone 1 Fill as specified in 10-1.23, "Zone 1 Fill – Clay" unless otherwise shown on the plans or directed by the Engineer.
B. All other excavations for removal of existing facilities shall be filled with Zone 4 Fill as specified in 10-1.26, "Zone 4 Fill – Random Fill and Basin Fill" unless otherwise shown on the plans or directed by the Engineer.

EXISTING STRUCTURES

[District and GEI Specification – text modified from other GEI project]

General

Existing structures and facilities shall be completely removed including foundations, buried utilities to be removed, fences to be abandoned, culverts, pipes, drainage structures, septic tanks, cesspools, and leach field structures. Prior to general demolition, remove all containers of hazardous materials and storage tanks from the structures.

Submittals

A. At least two weeks prior to removing structures, submit a Demolition and Disposal Plan to the Engineer for approval. The Demolition and Disposal Plan shall consist of description of the procedures proposed to accomplish the work, including:

1. Provisions for safe conduct of the work including: procedures and methods to provide necessary supports, lateral bracing and shoring when required, careful removal and disposition of materials specified to be salvaged, protection of property which is to remain undisturbed, coordination with other work in progress, timely disconnection of utility services, and dust and spill control. The procedures shall include a detailed description of the methods and equipment to be used for each operation and the sequence of operations.
2. Procedures for careful removal and disposition of materials specified to be salvaged, coordination with other work in progress, and a summary of proposed disposal facilities that will be used for each type of material.
3. A list of proposed disposal, reuse, and salvage facilities. All disposal, reuse, or salvage of facilities must be approved by the District prior to the start of work.

B. After removal is completed, provide a written statement signed by an officer of the Contractor's firm indicating that materials from demolition activities were disposed of or salvaged in accordance with applicable local, state, and federal laws. Include supporting documentation as required by the Engineer.

WELL DESTRUCTION

General

Well destruction includes destroying water supply wells and piezometers below finish grade. Well destruction includes component removal, well bore sealing, surface seal construction, and surface restoration.

The Contractor shall furnish all permits, labor, equipment, materials, and supplies required to destroy wells. Wells and piezometers shall be destroyed in accordance with the provisions of the California Well Standards (DWR Bulletins 74-81 and 74-90), applicable Contra Costa County well ordinances, and the Contra Costa County well destruction guidelines found at http://www.cchealth.org/groups/eh/pdf/land_use/well_distruction.pdf. In the event of conflict between these special provisions and any governing code, Engineer shall be notified immediately of the conflict.

The Contractor shall have a valid California C57 Water Well Drilling Contractor's license, shall obtain and pay fees for all the applicable permits and inspections, and shall file all applicable records of well destruction with the County of Contra Costa and the State of California.

Contractor shall assemble available information about the well conditions, depth and type of casing, depth of well, and bore diameter.

Before the well is destroyed, it shall be investigated to determine its condition, details of construction, and whether there are obstructions that could interfere with the process of filling and sealing. This may include the use of down-hole television and photography for visual inspection of the well.

The well shall be cleaned, as needed, so that all undesirable materials, including obstructions to filling and sealing, debris, or pollutants and contaminants that could interfere with well destruction are removed for disposal. Prior to destruction, the well bore shall be cleaned out to remove all debris that restricts placement of a sand-cement grout or concrete filler sealing material. This clean out may include physically removing debris, pulverizing the debris, or any other suitable method. The existing conductor casing shall also be removed. Material to be extracted from the original borehole shall be removed by means of drilling, including overdrilling, if necessary. Contractor shall remove the old casings from the site and dispose of them in a legal manner.

The District shall be notified as soon as possible if pollutants and contaminants are known or suspected to be in a well to be destroyed. Well destruction operations may then proceed only at the approval of the District.

For water supply wells, Contractor shall perforate or puncture the well casing throughout its depth to ensure that filler and sealing material fills not only the well casing but also any annular space or nearby voids between the casing and the adjacent ground. For piezometers, Contractor shall remove well materials by overdrilling.

Prior to filling and sealing, a hole shall be excavated around the well casing to a depth of 5 feet below the ground surface and the well casing and manhole removed to the bottom of the excavation as shown on the Drawings. The sealing material used for the upper portion of the well shall be allowed to spill over into the excavation to form a cap with a depth of one foot.

The well or borehole shall be filled and sealed with sand-cement grout or concrete, poured in one continuous operation, from the bottom of the well up to the top. The sand-cement grout or concrete shall be placed by tremie pipe initially installed to the bottom of the well. The tremie pipe shall be gradually withdrawn so that the open end of the pipe remains below the level of sand-cement grout or concrete in the well throughout the well-filling and sealing operation. The well shall be sealed by methods that prevent free fall, dilution, and/or separation of aggregate from cementing materials.

To assure that the well or borehole is filled and sealed and that there has been no jamming or "bridging" of the filler or sealing material, verification shall be made that the volume of filler and sealing material placed in the well bore at least equals the volume of the empty hole.

During periods when no work is being done on the well or borehole, such as overnight or while waiting for sealing material to set, the well and surrounding excavation, if any, shall be covered. The cover shall be sufficiently strong and well enough anchored to prevent the introduction of foreign material into the well and to protect the workers and public from a potentially hazardous situation.

After the well or borehole has been properly filled and sealed, including sufficient time for sealing material in the excavation to set, the excavation shall be filled with native clay material that is moisture conditioned, placed in lifts not exceeding six inches in thickness, and compacted to a unit weight not less than 100 percent of laboratory maximum dry density according to ASTM D698.

Filler and Sealer Materials

Sand-cement grout shall be mixed at a ratio of not more than 188 pounds of sand to one 94-pound sack of Portland cement type II (2 parts sand to 1 part cement, by weight) and about 7 gallons of clean water. Sand shall be clean, washed silica sand with 90 to 100% passing the #60 US standard sieve and 0 to 2 % passing the #200 US standard sieve.

Concrete shall consist of Portland cement and aggregate mixed at a ratio of eight-94 pound sacks of Portland cement per cubic yard of aggregate. Aggregate shall be uniform 3/8-inch aggregate.

The sand-cement grout and/or concrete filler sealing mixtures shall be mechanically mixed with a paddle type mixer. No accelerator, such as calcium chloride, will be added to the grout unless expressly approved in advance by the Engineer.

Water shall be added to sand-cement grout and/or concrete filler and sealing mixtures to attain proper consistency for placement, setting, and curing. Water used for filler and sealing mixtures shall be potable water, compatible with the sealing materials specified herein, free of petroleum and petroleum products, and shall be free of suspended matter.

Records

Contractor shall keep daily records of all well destruction activities performed and products used and shall have the daily report agreed upon and signed at the end of each day by Engineer. Contractor shall also keep complete records of each well destroyed. Such records shall be furnished to Engineer at the completion of the work on each well. The records shall contain the following information:

1. Date, weather and time
2. Contractor and Engineer's representatives at site.
3. Location and identifying number of well and reference to survey data.
4. Approximate ground elevation at well.

5. Results of investigation of construction details and condition of each well including the depth, vertical arrangement, thickness, and a description of the character of well materials; well condition; and the details and locations of any obstructions that may interfere with well destruction.
6. Depth below ground surface at which groundwater was encountered.
7. Complete well destruction details including documentation of obstruction removal; the volumes, types, vertical arrangement, and placement details of filler or sealing material placed in each well bore; details of upper seal construction.

Upon completion of work, the Contractor shall provide a written report of the well destruction activities including copies of all required well permits and forms to Engineer. Upon completion of work, the required records, reports, complete well destruction logs referenced to ground surface with material classification as previously described, together with all notes, remarks, and pertinent information required by this specification, shall be submitted and delivered by the Contractor to Engineer.

The Contractor shall prepare and submit all reports to the regulatory authority as required by applicable regulations and permits and shall provide copies to the Engineer.

Coordination and Inspections

The Contractor shall make arrangements and provide required notifications to all State and County inspectors required to observe well destruction. The Contractor shall notify the Engineer at least 72 hours in advance of any well destruction activities so that the Engineer may be present to observe activities.

At all times, each well destruction crew shall be under the direction of a competent foreman experienced in well destruction procedures.

MEASUREMENT

Except for well destruction, no measurement will be made for existing facilities removal. Measurement of wells and piezometers to be destroyed will be per linear foot of well or piezometer as measured from the existing ground surface.

PAYMENT

Existing Facilities Removal

Full compensation for existing facilities removal, excluding well destruction, shall be considered as included in the lump sum price bid for existing facilities removal and no additional compensation shall be allowed therefor.

The lump sum price for existing facilities removal shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in facilities removal, disposal, and salvage of materials and for backfilling excavations, as shown on the plans, as specified herein, and as directed by the Engineer.

Well Destruction

Full compensation for well destruction shall be considered as included in the linear foot price bid for well destruction and no additional compensation shall be allowed therefor.

The unit price for well destruction shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in well destruction, including backfilling to original grade, as shown on the plans, as specified herein, and as directed by the Engineer.

10-1.17 CLEARING AND GRUBBING

[District and GEI Specification – text modified from other GEI project]

Clearing and grubbing shall conform to the provisions in Section 16, "Clearing and Grubbing," of the Standard Specifications and these special provisions, except that grubbing is required under all embankments regardless of whether the grading plane is more than 2 feet above the natural ground.

Do no remove trees and shrubs unless they are shown and noted on the plans to be removed or conflict with the proposed improvements. All trees and shrubs conflicting with grading, utilities or other improvements, or overhanging the improvements so as to form a nuisance or hazard to the public shall be removed. Trim trees not requiring removal to provide 18 feet of clearance over structures and roadways. Cut roots exposed in trench and roadway excavation at the excavation line in accordance with recognized standards of good arboricultural practices.

The provisions of the last paragraph of Section 16-1.03, "Construction," of the Standard Specifications are amended to also include the trimming of roots of trees and shrubs that are to be left in place.

Clearing shall be accomplished along the alignment of the main dam; saddle dike; spillway; basin inlet and outlet structures; low flow channel and surrounding environmental enhancement area; detention basin; maintenance road; and as required to construct ditches, roads, haul roads, and other infrastructure. Trees, downed timber, snags, slash, brush, garbage, trash, debris, fencing and other items shall be cleared flush with the existing ground surface. Trees and vegetation designated to remain shall be protected from damage from construction operations.

Grubbing shall be accomplished along the alignment of the main dam; saddle dike; spillway; basin inlet and outlet structures; low flow channel and surrounding environmental enhancement area; basin excavation; maintenance road; and as required to construct ditches, roads, haul roads, and other infrastructure.

All holes caused by grubbing operations or removal of pipes and drains that extend below the required bottom of foundation or other excavations shall be backfilled as follows:

- Within the main dam foundation, saddle dike foundation, inlet and outlet structure foundations, and spillway foundation, all holes shall be backfilled with Zone 1 Fill and as specified in 10-1.23, "Zone 1 FILL – Clay" unless otherwise shown on the Drawings or directed by the Engineer.
- For holes that extend below the excavation limits where Zone 4 fill, as specified in section 10-1.26, "Zone 4 Fill – Random Fill and Basin Fill," is to be placed on the excavation subgrade, fill the holes with fill material of the same type as that specified for overlying fill, unless other otherwise specified by the Engineer. Place the fill material in maximum 6-inch-thick loose lifts to the elevation of the adjacent ground surface. Compact each lift to the same density as specified for the overlying fill.
- For holes that extend below the planned bottom of basin excavation where fill is not required to be placed, fill the holes with native material of the same type as the surrounding soil. Place the material in maximum 6 inch loose lifts to the elevation of the

adjacent ground surface. Compact each lift to a density at least equal to that of the adjacent, firm, undisturbed material.

MEASUREMENT

Not applicable.

PAYMENT

Full compensation for clearing and grubbing shall be considered as included in the lump sum price bid for clearing and grubbing and no additional compensation shall be allowed therefor.

10-1.18 STRIPPING

]District and GEI Specification] [District - How will the contractor deal with stripped soils not used for the restoration area? We assume they can be placed in the surplus soil stockpile]

Stripping shall conform to Section 19, "Earthwork" of the Standard Specifications and these special provisions.

Stripping shall consist of the removal and disposal of weeds, grass, and other vegetative materials from the cleared ground surface and the excavation and removal of soil containing roots and other organic matter. Except for along the Calpine gas pipeline, stripping shall be to the greater of the depth specified below; the depth required to remove all roots, organic materials, and other deleterious materials; or the depth shown on the plans.

- Minimum stripping depth for the main dam footprint, saddle dike footprint, outlet works footprint, and spillway footprint shall be 12 inches.
- Minimum stripping depth for detention basin, basin inlet structure, basin fill areas, and other areas shown on the plans shall be 6 inches.

Along the Calpine gas pipeline, special stripping requirements shall apply. Prior to stripping, mark the location of the pipeline on the ground. Within 5 feet either side of the pipeline, limit the depth of stripping to 6 inches.

Organic soil removed during stripping operations from the area shown on the project plans shall be stockpiled, at the location shown in the plans or otherwise approved by the Engineer, and shall be subsequently reused in the restoration area shown in the plans by spreading to the depth indicated. At the direction of the Engineer, soil with low organic content, other soil deemed to be unsuitable for reuse as topsoil in the restoration area, or excess stripped soil shall be disposed of in accordance with 10-1.29 "Surplus Soil."

MEASUREMENT

Stripping as shown in the plans and required by these special provisions will be measured by the acre of land stripped.

PAYMENT

Full compensation for stripping shall be considered as included in the unit bid price for stripping and no additional compensation shall be allowed therefor.

The price per acre for Stripping shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in stripping, stockpiling, testing, and

disposal of stripped materials by spreading over the restoration area to the indicated depths, as shown on the plans, as specified herein, and as directed by the Engineer.

10-1.19 EXCAVATION

[District and GEI Specification – text modified from other GEI project]

Excavation shall conform to Section 19, "Earthwork" of the Standard Specifications and these special provisions.

GENERAL

Excavation shall consist of removal of material to the lines and grades shown on the Drawings or as otherwise directed or approved by the Engineer. The work in this section will include furnishing the labor and equipment to perform excavations required by these special provisions and shown on the plans. Hauling, moisture conditioning, placement, testing, and disposal of excavated materials shall be considered as included in the various other contract items of work.

The geotechnical and geologic conditions for all excavations defined herein and as shown on the Drawings are the District's interpretation of the conditions based upon core borings, field mapping and other data presented in the Upper Sand Creek Detention Basin (USCDB) Geotechnical Data Report. It is the Contractor's responsibility to become familiar with the data presented in the USCDB Geotechnical Data Report. The Contractor shall make his or her own interpretation of these geotechnical data and shall assume full responsibility for their interpretation. The estimated extent of the excavation is shown on the Drawings. Actual required excavation may be deeper or shallower than that indicated.

Excavation shall include excavations for structure and embankment foundations, key trench, detention basin, low flow channel, ditches, and other required excavations not included with other elements of work as specified in the special provisions. Excavation as specified in this section shall not include excavations related to grubbing, stripping, or other excavation work included with other elements of work.

The excavations for dam structure and embankment foundations (main dam, outlet works, spillway, and saddle dike) will require approval by the Engineer and the California Division of Safety of Dams (DSOD). The Engineer and DSOD must inspect and approve all foundation surfaces prior to placement of embankment material or concrete. Additional excavation may be required to obtain a satisfactory foundation and shall be performed as directed in the field by the Engineer.

All material to be excavated is expected to be excavatable with heavy excavation equipment. Blasting will not be allowed.

Required excavations shall be constructed to the lines, grades, and cross sections indicated on the plans unless otherwise directed by the Engineer. Any excavation below the depths and slopes specified herein, shown on the plans, or directed by the Engineer shall be backfilled by the Contractor, at the Contractor's expense, to the specified permissible excavation line with material approved by and placed and compacted as specified by the Engineer. Over-excavation outside the limits of foundations or structures shall be backfilled with similar material, compacted to equal or greater density than the over-excavated material or as otherwise approved by the Engineer. Over-excavation within the limits of foundations or structures shall be backfilled to grade with material approved by and placed and compacted as specified by the Engineer.

Perform the excavations in a manner that minimizes damage to or loosening of soil beyond the limits of the excavations. If subgrades or foundations are disturbed or loosened by the excavation beyond the lines and grades shown on the plans, remove such disturbed or loosened materials and replace them as specified for over-excavation above and as directed by the Engineer at no additional cost to the District.

Maintain and protect the excavation slopes and bottom in a satisfactory condition at all times until final completion and acceptance of the work under the Contract. If in the opinion of the Engineer, equipment causes rutting, quaking, heaving, cracking, or excessive deformation of the excavations slopes or bottom, the Contractor shall limit the type, load, or travel speed of equipment, and the Contractor shall repair any damage to the work to the satisfaction of the Engineer.

If sliding occurs in any part of the excavations as prescribed in 19-2.04, "Slides and Slipouts" of the Standard Specifications, the Contractor shall repair the slide as directed by the Engineer. If the Engineer determines that the slide was caused by Contractor operations, the Contractor shall repair the slide at no additional cost to the District.

DAM FOUNDATION EXCAVATION

General

Dam and saddle dike foundations are defined as the contact between the dam or dike and the existing ground, including the contact of the outlet works and emergency spillway with the existing ground.

The following shall apply

- Plans: Alignment and excavation lines shown on the plans may be revised by Engineer subject to foundation conditions encountered during excavation. Engineer will examine completed excavations and determine if the foundation soils meet the intent of the design or if additional excavation is required prior to the start of foundation treatment and backfilling.

- Test Pits: The Engineer may direct the Contractor to excavate exploratory pits or trenches into the dam or dike foundation areas to investigate underlying materials for determining whether the foundation conditions meet the design intent or additional excavation is required. Pits or trenches will not exceed depths of 15 feet and will be paid under the Excavation contract payment item. Exploratory pits and trenches shall be backfilled as directed by the Engineer. Generally, backfill material shall be the material to be placed over the area of the foundation where the pit or trench is cut. Backfill shall be compacted to the same density as specified for the overlying material or as specified by the Engineer.

- Temporary Haul Roads: Haul roads shall not be constructed across the dam or dike footprint unless approved by the Engineer in writing. No haul roads shall be cut into the right abutment below Elevation 180 feet. Haul roads within the dam foundation footprint shall be completely removed and the surface treated as specified herein. If any access/haul road construction within the dam or dike foundation footprint results in increased foundation excavation to achieve a satisfactory foundation condition, the resulting earthwork will not be considered for measurement and payment. After a road is removed, the foundation shall be inspected by the Engineer. Prior to placing embankment fill materials, the Contractor must received written approval of the foundation as specified above.

- Inspection: The Work will be inspected the Engineer and DSOD. The Contractor shall cooperate during such inspections, and provide any labor and equipment needed to support the Engineer and DSOD in their inspections.

General Sequence of Foundation Excavation and Treatment

The general sequence of operations for dam foundation excavation, treatment, and cleanup shall be as follows:

a. Perform excavation in the presence of the Engineer.

b. Request inspection of foundation excavation by the Engineer.

c. After the inspection, the Engineer will either provide written approval of the excavation or will provide direction to continue with excavation. Perform additional excavation as required to obtain Engineer approval. The Engineer will re-inspect the foundation after any required additional excavation is performed.

d. Upon receipt of written approval from the Engineer, perform foundation treatment and cleanup in accordance with 10-1.22, "Foundation Treatment".

e. Request inspection of final foundation surface by Engineer.

f. After the inspection, the Engineer will either provide written approval of the final foundation surface or direction to perform additional treatment and cleanup. Perform additional treatment and cleanup as required to obtain Engineer approval. The Engineer will re-inspect the foundation after any required additional cleanup or treatment is performed.

g. Upon receipt of written approval of final foundation surface from the Engineer, place first lift of embankment fill or other material.

Acceptance of Foundation Excavation and Foundation Surface

The foundation excavation will be inspected by the Engineer and DSOD after excavation is completed to final grade, and the foundation surface will be inspected by the Engineer and DSOD again after cleanup and treatment. The Contractor shall not place fill or other material on the foundation surface prior to receiving written acceptance of the foundation surface by the Engineer.

Before acceptance of the foundation excavation or surface, the Engineer or DSOD may require additional excavation, treatment, or cleanup to obtain a satisfactory foundation. Additional excavation, cleanup, or treatment shall be performed as directed by the Engineer.

In the event the Contractor places fill or other material on the foundation surface prior to receipt of written acceptance by Engineer, the fill or other material will be rejected and the Contractor shall remove such material. No payment will be made for any such rejected material, for the costs of its removal and disposal, or for additional work required to restore the foundation surface to its condition prior to placement of the fill or other material.

The following time limits shall apply to notification of the Engineer prior to foundation excavation and treatment inspection and to the Engineer's response time:

- The Contractor shall notify the Engineer a minimum of 72 hours in advance of when the foundation excavaion or treated foundation surface will be ready for its first inspection.
- If additional excavation, treatment, or cleanup is required before the Engineer will accept the foundation, the Contractor shall notify the Engineer a minimum of 48 hours in advance of when the foundation excavation will be ready for re-inspection.
- If the foundation excavation is not ready for inspection or re-inspection within 4 hours of the time that the Contractor indicates, the Engineer shall be allowed up to 48 hours to reschedule the inspection.

- After the initial foundation inspection or any re-inspection, the Contractor shall allow up to 48 hours for the Engineer to provide written acceptance or to provide requirements for additional excavation, treatment, or cleanup to be completed before the foundation will be accepted. If the Contractor is required to do additional excavation, treatment, or cleanup before foundation excavation acceptance, the foundation must be re-inspected by the Engineer before the Engineer accepts the foundation.

Excavation Requirements

Requirements for main dam and saddle dike foundation treatment include the following:

A. Excavate all foundation areas to sufficient depths, as determined by Engineer, to remove all unacceptable materials and to shape the foundation surfaces as shown on the plans or as directed by the Engineer. Unacceptable materials include all debris, loose soils, organic matter (including vegetation, stumps, roots, etc.), and all soil that does not meet the foundation objectives specified in item B below. Excavation work also includes removing loosened soil from final foundation surfaces prior to placing embankment fill or concrete.

B. Excavate all artificial fill (q_{af}), recent channel alluvium (q_{al}), and younger terrace materials (q_{t1}) from the foundation footprint to expose stiff clay from the older terrace materials (q_{t2}) over the entire foundation surface as shown on the plans and as directed by the Engineer. Exception is made for the rock slope protection at the terminus of the emergency spillway (downstream of Station 9+00), which shall not require removal of all recent channel alluvium (q_{al}), and younger terrace materials (q_{t1}).

C. Excavation slopes in the dam foundation shall be as follows:

1) Key trench side slopes: 1(H):1(V) or flatter.
2) Cut slopes along dam upstream and downstream toes: 1(H):1(V) or flatter.
3) Foundation excavation slopes within dam footprint other than (1) and (2) above: 2(H):1(V) or flatter unless shown otherwise on the plans.

D. Smooth out the foundation and abutment surfaces by removing high spots and excavating as needed so that the foundation and abutment surfaces will be 1(H):1(V) or flatter. Shape the final foundation to obtain a relatively uniformly varying profile free of sharp offsets, protruding points, benches, edges, or breaks, and so that variations in elevation are gradual as shown on the plans.

F. Once the required excavation depth has been achieved, maintain the foundation surface free of water and cleaned of all loose, soft, disintegrated, rutted and/or erodible materials.

G. Where the slope and orientation of the foundation surface is such that a sliver fill (defined as less than 10 feet in horizontal thickness) would be constructed to achieve final grades shown on the plans, perform additional excavation to obtain a minimum horizontal fill width of 10 feet.

EXCAVATION PLAN

At least 3 weeks prior to beginning excavation, the Contractor shall submit an Excavation Plan to the Engineer for approval. At a minimum the plan shall include:

A. A detailed Excavation Work Plan that describes excavation procedures proposed for all excavations. The plan shall include the following:

- Proposed temporary construction haul route locations and details including the proposed methods of construction and restoration of the temporary haul roads.
- Haul route traffic flow pattern including proposed flow of excavated material to spoil, to temporary stockpile and directly to embankments throughout all stages of excavation.
- Ramping schemes for excavation.
- Number and types of equipment.
- Number and length of shifts.
- Manpower projections.
- Sequence of work.

Coordinate the Work Plan with the Borrow Area Plan required below and all other parts of the construction.

B. A Temporary Excavation Slope Plan that includes detailed calculations and plans for all temporary slopes and slope support measures proposed for the work. The submittal shall demonstrate that the proposed temporary slopes have an adequate factor of safety to prevent failure of the slope, which includes significant slope movement. The plan shall include details of excavated slopes, schedule, impact of weather and rain, and details and calculations for any temporary support measures needed. Include assumed material strength properties and ground water levels, and indicate dewatering requirements to maintain slopes. Approval of the Temporary Excavation Slope Plan by Engineer shall not relieve the Contractor of full responsibility for temporary slope stability including responsibility for repairing any damage to any part of the work caused by failure of a temporary slope at no additional cost to District. The Contractor shall have sole responsibility for all aspects of the safety of the excavation operations.

OVEREXCAVATION OF SLIDE AREAS ALONG SOUTH EDGE OF BASIN

At the locations shown on the plans or as indicated by the Engineer, mitigation of existing landslides shall be accomplished by excavating and removing the slide materials and replacing the excavated soil with compacted fill. Excavation is expected to extend a minimum horizontal distance of 5 feet into the hill beyond the apparent slide surface to ensure complete removal of the landslide materials. The excavation lines and grades shown on the plans may not be sufficient to completely remove the existing landslides, and excavation may be required beyond the lines and grades shown. The extent of the removal beyond the lines and grades shown on the plans shall be determined by the Engineer after observation of conditions in the excavation.

BORROW FROM REQUIRED EXCAVATIONS

General

Materials for Zone 1, Zone 4, and Zone 6 fill shall be obtained as borrow from excavations required by these special provisions and as shown on the plans. Borrow shall be obtained from excavations performed to construct various items of work shown on the plans, such as detention basin excavation, key trench excavation, and embankment and structure foundation excavation. Borrow from other sources will not be allowed unless approved by the Engineer. Borrow excavations shall not be performed outside of the required excavation limits shown on the plans.

The Contractor shall determine the locations and quantities of suitable fill materials available from various excavations. Contractor shall identify excavations for Zone 1, Zone 4, and Zone 6 borrow and develop suitable borrow excavation procedures prior to beginning production

excavation. Contractor shall submit proposed borrow locations and borrow excavation procedures as part of the Borrow Area Plan described herein.

Contractor shall perform a detailed characterization of the borrow materials ahead of excavation and sequence the borrow operations to obtain the required amounts of fill materials and minimize interference with construction of other elements of the work. Contractor shall perform additional testing and observation of borrow sources as required during excavation operations to ensure that the materials meet the specified requirements for the fill type being excavated. The Contractor shall identify materials through the use of frequent Atterberg limit testing, grain size analyses, visual-manual identification, and other tests required for borrow characterization prior to, and as required during, the production excavation operations. Contractor shall have a qualified and experienced geologist or geotechnical engineer planning, directing, and inspecting the borrow excavation on a continuous basis.

The required excavations will encounter differing soil types and conditions and some soils will be unsuitable for use as fill materials specified herein. Shallow subsurface materials will generally include sandy, silty and clayey deposits, but channel deposits will be encountered that include gravelly soils. Soil types and conditions will vary. Layers of an individual soil type may be erratic and discontinuous. Materials unsuitable for use as borrow and excess materials shall be disposed of in accordance with 10-1.29, "Surplus Soil." Prior to excavating borrow, the contractor shall strip the area in accordance with 10-1.18, "Stripping" herein.

Groundwater may be encountered in excavations and may be higher or lower than shown on the subsurface exploration logs due to seasonal climatic conditions and groundwater pumping practices. All borrow materials will require moisture conditioning prior to placement in the fill areas. All moisture conditioning of borrow material shall be performed in the borrow area or in stockpiles prior to placement in the fill areas. Moisture conditioning of borrow material during placement and spreading in the fill areas shall not be allowed except for minor adjustments in moisture content.

Borrow excavations shall be maintained in a dewatered condition in accordance with 10-1.21 "Dewatering." Surface drainage of borrow site shall be maintained with proper stormwater pollution control measures in place in accordance with 10-1.04, "Water Pollution Control."

Borrow Area Plan

At least 3 weeks prior to developing borrow areas, the Contractor shall submit a Borrow Area Plan to the Engineer for approval. At a minimum the plan shall include:

A. Identification of excavations to be used as borrow areas, the sequence of borrow area development, and the fill type to be excavated from each borrow area.
B. Detailed plan for characterizing borrow areas relative to soil types required for this project and for controlling conformance of excavated materials with specification requirements. Plan shall include sampling and testing procedures, locations, and frequencies.
C. Plan for moisture-conditioning the soil in borrow or stockpile areas to the specified moisture range for compaction prior to placing the soil in the fill areas. Moisture conditioning shall not be allowed in the fill areas.
D. Temporary drainage measures, including drainage outlets, pumping systems, and other measures that will be employed to control groundwater and surface runoff.

EXCAVATION PRIOR TO PLACEMENT OF BASIN FILL

Notify the Engineer, at least 24 hours prior to placement of the first lift of "Basin Fill", specified in 10-1.26, "Zone 4 – Random Fill and Basin Fill" of these special provisions, at the locations shown on the plans. The Engineer will inspect the foundation area for the proposed Basin Fill and determine if the foundation is suitable to receive the Basin Fill. If the Engineer determines that the foundation is not suitable to receive the Basin Fill, excavate to remove unsuitable materials as directed by the Engineer.

MEASUREMENT

The quantity of Excavation to be paid for will be measured by the cubic yard to the neat lines shown on the project plans for required excavations or as approved or directed by the Engineer. Excavations will not be categorized by structure or material type. If directed by the Engineer to excavation beyond the lines or grades shown on the plans, the additional excavation volume will be measured using the average end area method.

Required excavations shall be constructed to the lines, grades, and cross sections indicated on the plans unless otherwise directed by the Engineer. The District reserves the right to increase or decrease the excavation depth, width, or side slopes or to make other changes as required to produce a safe and functional structure. Changes in quantities resulting from such revisions will not constitute justification for change in contract unit prices.

PAYMENT

Payment for Excavation shall be deemed included in the unit price bid for Excavation and no additional compensation will be allowed therefore.

The price bid per cubic yard for Excavation shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in Excavation, as shown on the plans, as specified herein, and as directed by the Engineer. Payment for Excavation will be limited to excavation of materials and preparation of the Borrow Area Plan. No additional compensation will be made for hauling, moisture conditioning, placement, testing, disposal, dewatering, water pollution control, or other actions included in the various other contract items of work.

10-1.20 TRENCH AND EXCAVATION PROTECTION

[District Specification –text from County special provisions]

Attention is directed to Sections 5-1.02, "Plans and Working Drawings," 5-1.02A, "Trench Excavation Safety Plans," and 7-1.01E, "Trench Safety," of the Standard Specifications and these special provisions.

The Contractor shall have a designated competent person on site at all times that excavation work is being performed. The competent person shall make daily inspection in accordance with all OSHA requirements. Competent person means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authorization of the Contractor to take prompt corrective measures to eliminate them.

Full compensation for conforming to the provisions in this section shall be considered as included in prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

10-1.21 TEMPORARY WATER DIVERSION AND DEWATERING

[District and GEI Specification – possible text modified from other GEI project]

GENERAL

Dewatering shall conform to Section 19-3, "Structure Excavation and Backfill," of the Standard Specifications and these special provisions.

Attention is directed to Section 10-1.05, "Construction Site Management," paragraph "Dewatering" of these special provisions.

Contractor shall divert surface waters and dewater the work site to provide working conditions free of water to the Engineer's satisfaction. Dewatering shall include the removal of surface water from all foundations and other working surfaces. The Contractor shall maintain the work site in a dewatered condition for the duration of the work. No work requiring dewatering shall begin until the dewatering system has been installed and such installation has been approved by the Engineer.

If Contractor's schedule extends into one or more winter seasons, Contractor's design for the stream diversion system for the dam site shall incorporate the means to safely pass a flow of 1,664 cfs [District to confirm or revise], which corresponds to the 10-year flood for the site, by combined action of the diversion system and a shallow open channel across the dam site or other approved means. If a channel across the dam site is provided, it shall be lined with erosion-resistant material satisfactory to the California Division of Safety of Dams (DSOD).

Contractor shall not take the stream diversion facilities out of service until the dam embankment has been completed to its design elevation and the outlet works and emergency spillway have been completed. Contractor shall obtain Engineer's written approval to proceed with taking the stream diversion facilities out of service.

Surface and groundwater control shall be accomplished in coordination with the required excavation, embankment construction, ditch, and structure construction. Surface and groundwater control will necessitate the use of measures such as temporary diversion ditches, cofferdams, conduits or flumes, pumps, pipes, and dewatering by the use of pumping, well point systems, and sumps. Contractor shall design, install, operate, maintain, and remove all necessary diversion and dewatering systems. Contractor shall have sole responsibility for all aspects of furnishing, operating, maintaining, and removing the diversion and dewatering systems. Methods for care of surface water and for controlling the surface and groundwater levels shall be subject to approval of the Engineer.

Contractor shall conduct construction operations to prevent free standing water at the site. Maintain drainage in all areas adjacent to and under construction. Construct ditches at such locations and in such a manner to avoid erosion damage to slopes of cuts and fill materials. Keep all temporary and final subgrade areas well-graded and drained. Prevent surface water and groundwater from entering excavations and the dam and dike foundation areas by using sumps and pumps, ditches, wells, or other means so that excavations, foundation treatment and cleanup, embankment construction, and concrete placement are accomplished in the dry and are kept dry throughout the duration of the work.

Where excavations extend below the water table, the portions below the water table shall be dewatered in advance of excavation. Dewatering shall be accomplished in a manner that will

prevent loss of fine materials from foundations or excavated surfaces, will maintain stability of excavated slopes and bottoms of excavations, and will result in construction operations being performed in dry conditions.

If groundwater seepage occurs within the dam footprint, control it by intercepting it upstream of the dam footprint using sumps, wells, or other methods approved by the Engineer. Collection drains or other dewatering measures installed within the dam core or its foundation will not be allowed unless approved by the Engineer prior to installation. Collection drains or other dewatering measures shall be completely removed. Grouted drains running through any part of the dam core or its foundation will not be allowed.

If suitable foundation material has been disturbed by the Contractor's operations, has been damaged by water, or has been removed for the Contractor's convenience in dewatering the foundation, the foundation shall be restored by the Contractor, at the Contractor's expense, to a condition at least equal to the undisturbed foundation as determined by the Engineer.

The Contractor shall use his own judgment in designing and implementing the required diversion and dewatering systems. The Contractor shall be responsible for and shall repair at his expense any damage to foundations, structures, or any part of the Work caused by floods, groundwater, surface water, or failure of any part of the diversion or dewatering systems. The Contractor shall not lay claim against the District for damages by surface or groundwater to his work, property, or materials. The Contractor shall comply with all applicable laws, statutes, and permit provisions.

Except for stream diversion flows diverted from upstream of disturbed ground and discharged downstream of the work area, all water collected from the diversion and dewatering systems shall be filtered and cleaned prior to releasing into any drainage system. The Contractor shall provide equipment such settling basins, filters, or other equipment required to accomplish filtering and cleaning of the water prior to discharge into any drainage system.

All materials furnished by the Contractor and utilized for temporary diversion and construction shall remain the property of the Contractor and shall be removed from the site upon completion of the Work. All cofferdams, diversions, protective works, and dewatering facilities that are not a part of the permanent work as shown on the plans, shall be removed upon completion of the Work. Cofferdam fill material from on-site excavations shall be hauled to approved spoil areas, but any imported cofferdam fill material shall be hauled off-site and disposed of in accordance with applicable laws at no additional cost to the District. All other materials and equipment shall be salvaged as directed by the Engineer or removed from the site. Temporary channels shall be refilled to match the level of adjacent elevations and grades and to conform generally to the original topography and appearance. Fill for temporary channels shall consist of materials similar to that of the surrounding, undisturbed soil. Fill for temporary channels shall be placed in maximum 6-inch-thick loose lifts and compacted to at least the density of the surrounding, undisturbed soil.

DIVERSION AND DEWATERING PLAN

At the preconstruction conference, provide a Diversion and Dewatering Plan to the Engineer for approval. The Diversion and Dewatering Plan shall describe the following in detail:

1. Proposed diversion plan for Sand Creek including diversion method, installation sequence, and installation and operation schedule.

2. Cofferdam design drawings and ancillary design documentation, as required, to obtain DSOD's review and approval.

3. Proposed diversion plan for the twin 84-inch pipeline including diversion method, installation sequence, and installation and operation schedule.

4. For borrow excavations, identify temporary drainage measures, including drainage outlets, pumping systems, and other measures that will be employed to control groundwater and surface water.

5. Proposed methods, schedule, and sequence for taking the Sand Creek and twin 84-inch pipeline diversion measures out of service.

6. The proposed means and methods for controlling surface and groundwater in the required foundation and trench excavations to maintain the excavations in a dewatered and safe condition for foundation preparation and backfilling. Include a description of the means and methods and a complete listing of equipment to be used.

7. Shop drawings, specifications, catalog cut sheets, and other technical data for all materials and equipment proposed for use in the water diversion and control.

The diversion and dewatering schemes shall be designed and certified by a California registered professional engineer. Include calculations, drawings, and specifications for all aspects of the diversion and dewatering systems, and disposal of water.

Submit 6 copies of the draft Diversion and Dewatering Plan to the Engineer. The Engineer and DSOD will have 4 weeks to review the plan. If revisions are required, as determined by the Engineer, the Contractor shall revise and resubmit the Diversion and Dewatering Plan within 5 working days of receipt of the Engineer's comments. The Engineer will have 5 working days to review the revisions. Upon the Engineer's acceptance of the Diversion and Dewatering Plan, 6 accepted copies of the plan, incorporating the required changes, shall be submitted to the Engineer. In order to allow construction activities to proceed, the Engineer may conditionally accept portions of the Diversion and Dewatering Plan while minor revisions are being completed. However, installation of the Sand Creek and twin 84-inch pipeline diversion systems, including the cofferdam and its foundation, may not begin until both DSOD and Engineer approval is received. Such approvals shall not relieve the Contractor from full responsibility for the adequacy of the diversion and dewatering systems or from responsibility for repairing any damage to permanent structures, or damage to any part of the Work caused by the installation, operation, failure, or inadequacy of the diversion and dewatering systems for any reason.

MEASUREMENT

Not applicable.

PAYMENT

Payment for designing, implementing, operating, and removing the stream diversion and dewatering systems will be made at the lump sum price bid for Stream Diversion and Dewatering, as set forth on the Bidding Sheet.

The contract lump sum price bid shall include full compensation for furnishing all labor (including filtering and cleaning), materials, tools, equipment, and incidentals, and for doing all work involved in designing, implementing, operating, and removing the dewatering system as specified herein and as directed by the Engineer.

Payment will be made in accordance with the following:

1. Eighty (80) percent of the bid price will be paid when the stream diversion and dewatering system is installed and such installation is approved by the Engineer.

2. The remaining twenty (20) percent of the bid price will be paid when the dewatering system has been removed and such removal is approved by the Engineer.

3. The sum of all payments for the installation and removal of the stream diversion and dewatering system shall not exceed the price bid for Stream Diversion and Dewatering as set forth on the Bidding Sheet. ***[District - Can #1 and #2 be replaced with "Payment will be made based upon a mutually agreed upon payment schedule"?]***

10-1.22 FOUNDATION TREATMENT

[GEI Specification]

Foundation Treatment shall conform to Section 19, "Earthwork" of the Standard Specifications, these special provisions, and the plans. Attention is directed to Section 19-3.04, "Water Control and Foundation Treatment" of the Standard Specifications.

GENERAL

Once the required excavation depth has been achieved, maintain the foundation surface free of water and cleaned of all loose, soft, cracked, desiccated, disintegrated, rutted and/or erodible materials.

Sweep or air jet trenches, structure foundations, and confined areas as needed to clean the foundation.

Clean and fill depressions and potholes in the foundation surface with compacted fill of the same material as specified for the overlying embankment.

Wherever groundwater seepage is encountered at or above final foundation grade, control seepage as specified in Section 10-1.21 of these Special Provisions. The portions of excavations below the water table shall be dewatered in advance of excavation. Dewatering shall be accomplished in a manner that will prevent loss of fine materials from foundations or excavated surfaces, will maintain stability of excavated slopes and bottoms of excavations, and will result in foundation treatment operations being performed in dry conditions.

Proof compact the foundation or subgrade with a minimum of 4 passes with a heavy tamping roller approved by the Engineer. Areas which cannot be compacted by roller equipment because of inadequate clearances shall be compacted with approved power tampers. Excavate and replace any soft, pumping, or disturbed material as directed by the Engineer.

Prior to placing fill against a slope, key the new fill into the existing slope as shown on the plans or as directed by the Engineer.

Immediately prior to placing the first lift of fill, the foundation or subgrade surface shall be loosened thoroughly by scarifying, plowing, disking or harrowing to a minimum depth of 6 inches and maximum depth of 8 inches. The moisture content shall be adjusted to the amount specified in

these Special Provisions for Zone 1 fill, and the foundation shall be compacted as specified in these Special Provisions for Zone 1 fill.

DAM FOUNDATION TREATMENT

Additional requirements for main dam (including outlet works and emergency spillway) and saddle dike foundation treatment include the following:

The dam foundation will require approval by the Engineer and the California Division of Safety of Dams (DSOD). The Engineer and DSOD will inspect and approve all foundation surfaces prior to placement of embankment material or other materials. Additional excavation and/or additional foundation treatment and cleanup may be required to obtain a satisfactory foundation and shall be performed as directed in the field by the Engineer. The general sequence of inspections and approvals is outlined in Section 10.1.19 "EXCAVATION" of these Special Provisions.

Once Engineer's approval of the final foundation surface has been given for a portion of the foundation, immediately cover the area with the first lifts of embankment fill to protect the prepared foundation surface from deterioration. If the Contractor fails to protect the prepared surface and the surface dries or otherwise deteriorates because of exposure to the elements or construction activity or is otherwise damaged as determined by the Engineer, the Contractor shall repeat the surface treatment and cleanup in the affected areas prior to beginning placement of embankment fill at no additional cost to the District. The Engineer's re-approval of the affected areas prior to covering with fill will be required.

Schedule, sequence and conduct foundation excavation, treatment and cleanup operations in such a manner that completed work in a portion of the foundation is not contaminated or damaged by operations in adjacent portions of the foundation. Any such contamination or damage shall be removed and repaired to the Engineer's satisfaction at no cost to the District.

At all times conduct the cleanup and treatment operations sufficiently ahead of embankment placement so that the embankment operation does not interfere with cleanup, inspection and treatment in any way.

Do not contaminate previously-placed embankment fill while excavating, treating and preparing foundation excavation areas. Remove and replace contaminated embankment fill to the Engineer's satisfaction at no cost to the District.

Special foundation treatment along Calpine gas pipeline:

a) Mark location of gas pipeline on the ground.

b) Within 5 feet either side of the gas line, limit the depth of scarification and moisture-conditioning to 4 inches.

MEASUREMENT

Foundation Treatment as shown in the plans or required by these special provisions will be measured by the acre.

PAYMENT

Full compensation for Foundation Treatment shall be considered as included in the unit bid price for Foundation Treatment and no additional compensation shall be allowed therefor.

The price per acre for Foundation Treatment shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in cleaning and protecting, proof-rolling, scarifying, moisture-conditioning and compacting foundation surfaces as specified herein, and as directed by the Engineer.

10-1.23 ZONE 1 FILL - CORE

[GEI Specification]

Earthwork for Zone 1 Fill shall conform to Section 19, "Earthwork" of the Standard Specifications and these special provisions.

Work in this section shall include selecting Zone 1 Fill from required excavations and processing, moisture conditioning, transporting, placing, spreading, compacting, and testing the Zone 1 Fill as shown on the plans and as specified herein.

SUBMITTALS

At least 3 weeks prior to beginning Zone 1 Fill placement, provide narrative description and drawings depicting the means and methods of performing work, including, but not limited to:

- Proposed methods for preventing interference with or damage to existing underground and overhead utility lines, and other man-made facilities and natural features designated to remain within or adjacent to the construction rights-of-way.
- A complete listing of major equipment used to excavate, blend, and transport the borrow material and to construct the embankment including excavating, moisture-conditioning, earthmoving, placing, grading, compacting, and finish-grading equipment.

MATERIALS

Unless otherwise approved by the Engineer, Zone 1 Fill material shall be selected from materials obtained from required excavations as specified in Section 10-1.19 EXCAVATION of these Special Provisions.

Zone 1 Fill shall consist of materials classified in accordance with ASTM D 2487 as SM, SC, CL, or ML. Zone 1 Fill shall be free from roots and other organic matter; contamination from hazardous, toxic or radiological substances, trash, and debris; and free of frozen materials. In addition, Zone 1 Fill shall meet the following requirements:

- Based on ASTM D422, "Standard Test Method for Particle-Size Analysis of Soils", 100 percent passing a 2-inch sieve and a minimum of 30 percent passing the No. 200 sieve.
- Based on ASTM D4318, "Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils", liquid limit less than 50 and plasticity index from 8 to 40.

PLACEMENT

The Zone 1 Fill shall be constructed by placement of continuous and approximately horizontal layers for the full length, and width of the embankment. The maximum allowable tolerance for deviation from this requirement shall be 1.5 vertical feet between any two locations along the main dam or saddle dike alignments. Additionally, Zone 1 Fill in the main dam embankment shall be placed at approximately the same rate as materials in adjacent embankment zones. The vertical difference between the Zone 1 fill and other fill materials in the embankment shall not exceed 1.0 feet vertically unless otherwise approved by the Engineer.

The end slopes of partial fill sections shall not be steeper than three horizontal to one vertical (3H:1V). When placing fill against the end of a previously placed lift or against existing abutment

slopes, the end slope of the previously constructed fill or existing slope shall be treated by slope benching and other foundation preparation procedures as shown on the plans and specified herein.

The Zone 1 Fill shall be constructed to the lines, grades, and cross sections indicated on the plans and to the tolerances prescribed herein, unless otherwise directed by the Engineer. The Engineer reserves the right to increase or decrease the foundation widths and embankment slopes or to make such other changes in the embankment or backfill sections as may be deemed necessary to produce a safe structure. Changes in quantities resulting from such revisions shall not constitute justification for change in contract unit prices, except as provided for in the Variations in Estimated Quantities clause of Section 4-1.03B, Increased or Decreased Quantities, of the Standard Specifications.

Contractor shall maintain and protect the embankments in a satisfactory condition at all times until final completion and acceptance of all work under the Contract. Haul paths across partially constructed embankment shall be varied and uniformly distributed over the surface of the embankment to prevent damage to the completed portion of the embankment and/or its foundation due to concentrated haul patterns. If, in the opinion of the Engineer, the hauling equipment causes horizontal shear planes or slicken sides, rutting, quaking, heaving, cracking, or excessive deformation of the embankment or its foundation, the Contractor shall change the type and reduce the size, load, or travel speed of the hauling equipment on the embankment, and the Contractor shall repair any damage to the embankment or embankment foundation to the satisfaction of the Engineer.

The Contractor may be required to remove, at his own expense, any Zone 1 Fill placed outside of prescribed slope lines. The Contractor shall excavate and remove from the embankment any material which is unsatisfactory and shall also dispose of such material and refill the excavated area as directed, all at no cost to the District.

Zone 1 Fill material shall be placed and spread in layers not more than 8 inches in uncompacted thickness. The Zone 1 Fill shall be placed such that the gradation and distribution of materials throughout each zone of the fill shall be free from lenses, pockets, streaks, and layers of material differing substantially in texture or gradation from surrounding material. During the placing and spreading process, the Contractor shall at all times maintain a force of workers adequate to remove all roots, debris, and oversized stone from all embankment materials.

Equipment traffic on any embankment zone shall be routed to distribute the compactive effort as much as practicable. Ruts formed in the surface of any layer of spread material shall be removed and the surface smoothed before that material is compacted.

If, in the opinion of the Engineer, the compacted surface of any layer of material is too smooth to bond properly with the next layer to be placed, the surface shall be loosened by scarifying or other approved methods before material for the next layer is placed.

The Zone 1 Fill shall be moisture conditioned in the stockpile or borrow area prior to placement. The moisture content of Zone 1 Fill material placed and spread for compaction shall meet the requirements specified under "Zone 1 FILL COMPACTION" below. Moisture conditioning in the embankment area is not acceptable except for minor adjustments needed as a result of work interruptions.

The materials in each layer of the fill shall contain the amount of moisture within the limits specified below or as directed by the Engineer and as necessary to obtain the required compaction. Material that is not within the specified moisture content limits during and immediately after compaction shall be moisture-conditioned and reworked to obtain the specified moisture content

and recompacted or replaced with fill meeting the requirements of this Section, regardless of density.

If the top or contact surfaces of a partial fill section become too dry to permit suitable bond with additional fill to be placed thereon, loosen the dried materials by scarifying or disking to depths directed by the Engineer, dampen the loosened material to an acceptable moisture content, and recompact the loosened material in accordance with the applicable requirements herein.

If the top or contact surfaces of a partial fill section become too wet to permit suitable bond with the additional fill to be placed thereon, scarify the wet material and permit it to dry (assisted by disking or harrowing if necessary) to depths directed by the Engineer, or remove and replace the fill with fill meeting the requirements of this Section. Removed material shall be dried in the borrow area or a stockpile area and reused as fill at no additional cost to District. The material shall be dried to acceptable moisture content and shall be compacted in accordance with the applicable requirements herein.

COMPACTION

Equipment

Compaction equipment shall consist of tamping rollers suitable for the material being compacted and to achieve the required compaction as specified herein. Tamping rollers shall be equipped with cleaning fingers designed and attached to prevent the accumulation of material between the tamping feet. The cleaning fingers shall be maintained at their full length throughout the periods of use of the roller. Tamping feet shall be maintained at a length that penetrates the entire uncompacted lift thickness. Tamping rollers shall not be operated at speeds exceeding 6 miles per hour.

If used, towed tamping rollers shall meet the following requirements:

- The two drums comprising one roller unit shall be yoked such that they can rotate relative to each other when traversing uneven surfaces.
- The use of a rubber-tired tractor for towing shall be discontinued if the tires leave ruts that prevent uniform compaction by the tamping roller.

Compaction of material in areas where it is impracticable to use a roller or tractor compaction shall be performed by the use of approved compactors specifically manufactured for work in tight quarters and shall be subject to approval by the Engineer.

Scarifiers, disks, spring-tooth or spike-tooth harrows, spreaders, and other equipment shall be suitable for use in embankment construction and approved by the Engineer. Discs shall have a minimum of two gangs hooked in tandem. The width of cut shall not be less than 12 feet. Disc blades shall be notched, shall be spaced at a minimum of 16-5/16-inches, and shall have a minimum diameter of 36 inches. If the disc blades exhibit more than 10% wear, the Engineer shall have the option to require the blades be replaced to ensure full penetration of the lift thickness. The discs shall be equipped with scrapers to prevent the accumulation of mud and debris between and on disc blades. Towed speeds shall not exceed five miles per hour and the angle of cut shall be adjustable while the tool is in operation.

Zone 1 Fill Compaction

After a layer of material has been placed and spread, it shall be harrowed to break up and blend the fill materials and to obtain uniform moisture distribution. Harrowing shall be performed to the

full depth of the layer with a heavy disk plow or other approved harrow. If one pass of the harrow does not accomplish the breaking up and blending of the materials, additional passes of the harrow shall be required.

When the moisture content and the condition of the layer are satisfactory, the lift shall be compacted to a minimum of 100 percent of the maximum dry density in accordance with ASTM D 698 using an approved tamping roller traversing in a direction parallel to the centerline of the embankment. In areas which are not accessible by roller, the fill shall be placed in layers not more than 4 inches in uncompacted thickness and compacted with an approved special compactor to a density equal to a minimum of 100 percent of the maximum dry density in accordance with ASTM D 698. Placing, spreading, and compacting may be performed at the same time at different points along a section when there is sufficient area to permit these operations to proceed simultaneously. Compaction equipment shall be operated such that the strip being traversed by the roller shall overlap the rolled adjacent strip by not less than 3 feet.

The moisture content of the Zone 1 Fill after compaction shall be within the limits of 2 percentage points above optimum to 2 percentage points below optimum moisture content as determined by ASTM D 698.

TESTING

The Contractor shall perform sufficient testing to ensure that the fill is being constructed as specified. The testing program specified below shall be considered the minimum acceptable. This does not relieve the Contractor from the responsibility of performing additional testing to ensure compliance with these special provisions.

A. Soil Classification: Soil classification tests shall be performed in accordance with ASTM D 2487. One initial classification test shall be required for each type of material to be utilized. As prescribed in ASTM D 2487, grain size analyses in accordance with ASTM D 422 and Atterberg limits in accordance with ASTM D 4318 shall be performed on each different soil type. The Contractor shall submit soil classification tests for every 2,000 cubic yards of each classification of fill material required in the work.

B. Moisture-Density Relationships: The moisture-density relations for each classification of material utilized shall be determined in accordance with ASTM D 698 unless otherwise specified. Prior to placing any fill material, a minimum of three five-point moisture-density tests shall be performed on representative samples of the material to be used as fill. During fill placement, a minimum of one additional five-point moisture-density test shall be performed for every 4,000 cubic yards placed. Additional tests will be required each time a new material is encountered. The moisture-density curves will be compiled to form a family of curves which will be utilized to estimate optimum properties (maximum dry density and optimum moisture content) for comparison with field density tests.

C. Moisture Content Tests: Contractor shall perform moisture content tests of the type and at the rate needed to effectively manage borrow material moisture conditioning operations in the borrow area so as to properly condition the material to within the specified moisture content prior to transporting the material to the embankment. At a minimum, one moisture content test will be performed for each 1,000 cubic yards of material placed or each lift of material whichever is more frequent. Determination of moisture content shall be performed in accordance with ASTM D

2216 as specified below for in-place density testing. ASTM D 4643 may be used to estimate the moisture content in the borrow area, but all final CQC tests shall be performed in accordance with ASTM D 2216. Fills not meeting the required specifications for moisture content shall be retested after corrective measures have been applied.

D. In-place Density Testing. The in-place density shall be determined in accordance with ASTM D 1556. Method ASTM D 2922 can be used by the Contractor to gage the progress of compaction, but once the required compaction level is achieved, the Contractor shall retest the material using ASTM D 1556. Perform at least one (1) in-place density test in accordance with ASTM D 1556 on each day of placement, for each lift of material placed, or for every 1,000 cubic yards of completed fill, whichever is more frequent. Randomly stagger the locations of the in-place density tests within the plan area of the fill. Collect a soil sample at each field density test location, adjust the moisture content uniformly throughout the sample to be dry of, but close to, the estimated optimum moisture content, and perform a one-point compaction test and a moisture content test on the soil sample. Perform the one-point compaction test in accordance with ASTM D 698. Plot the results of the one-point compaction test on the family of curves for the material type to obtain the appropriate maximum dry density for comparison with dry density obtained from the in-place density test. Fill not meeting the required specifications for in-place density shall be retested after additional compaction has been completed.

SUBSTANTIAL COMPLETION

Contractor shall complete each embankment to meet the crest profile with camber shown on the plans at the same time for the full length of the embankment. At the time of substantial completion of the dam, the full length of the crest shall be at or above the crest profile with camber shown on the plans. Substantial completion shall only be granted for the fully completed embankment and at a single point in time. The Contractor shall request a survey of the as-constructed grade of the embankment crest to demonstrate substantial completion. Sufficient advance notice shall be given to the District to allow the survey to be made within two weeks of the date of embankment completion. Survey shall include (1) coordinates and elevations of embankment crest centerline at each 100-foot station, (2) elevations of waterside and landside edge of crest taken at 10-foot offset from the centerline at each 100-foot station, and (3) the coordinates and elevations of all survey monuments installed under the Contract. Coordinates shall be obtained with an accuracy of 0.1 feet. Elevations taken on the crest shall be within an accuracy of 0.1 feet, and elevations of survey monuments shall be with an accuracy of 0.02 feet.

QUALITY CONTROL

The Contractor shall establish and maintain field quality control for foundation preparation, Zone 1 Fill, and other operations to assure compliance with contract requirements. The Contractor shall maintain detailed records of field quality control for all operations, including but not limited to, the following:

A. Earthwork Equipment: Type, size, number of units, and suitability for construction of the prescribed work.
B. Fill Placement: Layout, drainage, moisture control, lift thickness, oversized material removal, root removal, spreading and compacting embankment fill and backfill.
C. Grade and Cross Section: Surveys to verify that the dimensions, slopes, lines and grades conform to those shown on the Drawings.

D. Borrow Material: The Contractor shall perform sampling, testing, and inspection of borrow areas prior to and continuously during borrow material excavation and moisture conditioning, as specified herein. Sampling, testing, and inspection shall be made by a qualified geologist or geotechnical engineer with experience in identifying the soil types and soil classifications required by these special provisions. Sampling, testing, and inspections shall be made for material types, changes in materials, and moisture content to achieve placement and compaction of materials to meet these special provisions.

E. Testing: The Contractor shall perform testing of the Zone 1 Fill and submit test results in accordance with 10-1.13 "Contractor Quality Control and Testing."

F. Progress Surveys: The Contractor shall survey the Zone 1 Fill weekly, and shall provide the following to the Engineer weekly:
   - Grade and cross section survey data documenting the limits of fill placed and demonstrating that the dimensions, slopes, lines, and grades conform to those shown on the plans and as specified herein.
   - Calculations establishing the weekly fill placement volume and cumulative total.

MISCELLANEOUS REQUIREMENTS

Slides and Foundation Failures

When sliding or excessive foundation deformation occurs in any part of the embankment prior to final acceptance of all work under the contract, the Contractor shall repair the slide as directed by the Engineer. When the slide is caused through the fault of the Contractor, the repair shall be made at no cost to the District. When the slide is not the fault of the Contractor, an equitable adjustment in the contract price shall be made in accordance with Section 4-1.03D, Extra Work, of the Standard Specifications to cover the cost of the repairs.

Compaction Adjacent to Structures and Utilities

Equipment for spreading and compacting fill shall not be operated within 5 feet of existing structures or utilities, including the transmission tower adjacent to the work, except as otherwise specified herein. Material within 5 feet of structures or utilities shall be compacted using appropriate special compactors approved by the Engineer.

Stockpiles

No material shall be stockpiled closer than 50 feet from the toe of any portion of the main dam or saddle dike foundations.

MEASUREMENT

The quantity of Zone 1 Fill to be paid for will be measured by the cubic yard to the neat embankment lines shown on the project plans or as approved by the Engineer.

PAYMENT

Full compensation for Zone 1 Fill shall be considered as included in the unit price bid for Zone 1 Fill and no additional compensation shall be allowed therefor.

The price bid per cubic yard for Zone 1 Fill shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in Zone 1 Fill, as shown on the plans, as specified herein, and as directed by the Engineer. Payment for Zone 1 Fill

shall include all costs associated with borrow investigations and testing, selecting, processing, moisture conditioning, transporting, placing, spreading, compacting, and testing the Zone 1 Fill as shown on the plans and as specified herein.

10-1.24 ZONE 2 FILL – FILTER SAND

[GEI Specification]

Zone 2 Fill shall conform to ASTM C33 "Standard Specification for Concrete Aggregates" and these special provisions.

MATERIALS

Zone 2 Fill shall conform to the grading and quality requirements for fine aggregate in ASTM C33 "Standard Specification for Concrete Aggregates," except that percent passing the No. 200 sieve shall be 5% or less. In addition, the specified grading requirements shall continue to be met after placement and compaction in the fill.

In accordance with ASTM C33, material shall consist of natural sand, manufactured sand, or a combination thereof. Material shall be free from roots and other organic matter; contamination from hazardous, toxic, or radiological substances; trash and debris; and frozen materials.

PLACEMENT AND COMPACTION

The Zone 2 Fill material shall be delivered to the placement location in a wet condition. Addition of water shall not be allowed once the material has been placed in the fill area. If in the opinion of the Engineer the Zone 2 Fill is not delivered in a wet condition, the Contractor shall remove the dry material at no additional cost to the District and replace the dry material with wet material.

Zone 2 Fill material shall be placed and spread in layers not more than 12 inches in uncompacted thickness. Additionally, Zone 2 Fill in the main dam embankment shall be placed at approximately the same rate as other materials in the embankment. The vertical difference between the Zone 2 fill and other fill materials in the embankment shall not exceed 1.0 feet vertically unless otherwise approved by the Engineer.

Compact each lift of Zone 2 Fill materials by application of four passes of a 5-ton-static-weight smooth-steel-drum vibratory roller. Roller drum shall be kept clean during compaction operations so as to preclude contamination of the Zone 2 Fill materials with native fine-grained soils.

TESTING

The materials shall conform to the grading and quality requirements specified. Prior to placement of material, Contractor shall obtain a representative sample of each material to be furnished and shall perform and submit a complete suite of grading and quality tests to determine compliance with the specifications. Tests shall include but not be limited to: grain size distribution, deleterious substances, and soundness as specified in ASTM C 33.

The Contractor shall submit additional suites of test results for every 2,000 cubic yards of material. Samples for grain size testing shall be obtained from previously placed and compacted material. Additional tests will be required if the borrow source is changed or if noticeable changes in the material occur.

MEASUREMENT

The quantity of Zone 2 Fill to be paid for will be measured by the cubic yard to the neat lines shown on the project plans or as approved by the Engineer.

PAYMENT

Full compensation for Zone 2 Fill shall be considered as included in the unit price bid for Zone 2 Fill and no additional compensation shall be allowed therefor.

The price bid per cubic yard for Zone 2 Fill shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in Zone 2 Fill, as shown on the plans, as specified herein, and as directed by the Engineer. Payment for Zone 2 Fill shall include all costs associated with procuring, processing, moisture conditioning, transporting, placing, spreading, compacting, and testing the Zone 2 Fill as shown on the plans and as specified herein.

10-1.25 ZONE 3 FILL – DRAIN GRAVEL

[GEI Specification]

Zone 3 Fill shall conform to Section 68, "Horizontal Drains" of the Standard Specifications and these special provisions

MATERIAL

Zone 3 Fill shall conform to the requirements for Class 1, Type A Permeable Material in Section 68 of the Standard Specifications. The specified grading requirements shall be met after placement and compaction in the fill.

PLACEMENT AND COMPACTION

The Zone 3 Fill material shall be delivered to the placement location in a wet condition. Addition of water shall not be allowed once the material has been placed on the foundation soils. If in the opinion of the Engineer the Zone 3 Fill is not delivered in a wet condition, the Contractor shall remove the dry material at no additional cost to the District and replace the dry material with wet material.

Zone 3 Fill material shall be placed and spread in layers not more than 12 inches in uncompacted thickness. Additionally, Zone 3 Fill in the main dam and saddle dike embankments shall be placed at approximately the same rate as other materials in the embankment.

Compact each lift of Zone 3 Fill materials by application of four passes of a 5-ton-static-weight smooth-steel-drum vibratory roller. Roller drum shall be kept clean during compaction operations so as to preclude contamination of the Zone 3 Fill materials with native fine-grained soils.

Special precautions shall be taken to protect the ends of partial fill sections from contamination. Protection shall be removed when placing additional material against the end of a previously placed section. The Zone 3 fill material shall continue to meet the specified grading requirements after placement and compaction in the fill.

TESTING

The materials shall conform to the grading and quality requirements specified. Prior to placement of material, Contractor shall obtain a representative sample of each material to be furnished and shall perform and submit a complete suite of grading and quality tests to determine compliance with the specifications. Tests shall include but not be limited to the following: grain size distribution and durability index as specified in Section 68-1.025 of the Standard Specifications.

The Contractor shall submit additional suites of test results for every 1,000 cubic yards of material. Samples for grain size testing shall be obtained from previously placed and compacted material. Additional tests will be required if the borrow source is changed or if noticeable changes in the material occur.

MEASUREMENT

The quantity of Zone 3 Fill to be paid for will be measured by the cubic yard to the neat lines shown on the project plans or as approved by the Engineer.

PAYMENT

Full compensation for Zone 3 Fill shall be considered as included in the unit price bid for Zone 3 Fill and no additional compensation shall be allowed therefor.

The price bid per cubic yard for Zone 3 Fill shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in Zone 3 Fill, as shown on the plans, as specified herein, and as directed by the Engineer. Payment for Zone 3 Fill shall include all costs associated with procuring, processing, moisture conditioning, transporting, placing, spreading, compacting, and testing the Zone 3 Fill as shown on the plans and as specified herein.

10-1.26 ZONE 4 FILL – RANDOM FILL AND BASIN FILL

[GEI Specification]

Basin Fill refers to Zone 4 Fill that is placed outside the footprint of the dam or saddle dike. Earthwork for Zone 4 Fill and Basin Fill shall conform to Section 19, "Earthwork" of the Standard Specifications and these special provisions.

Work in this section shall include selecting Zone 4 Fill and Basin Fill from required excavations and processing, moisture conditioning, transporting, placing, spreading, compacting, and testing the Zone 4 Fill as shown on the plans and as specified herein.

SUBMITTALS

At least 3 weeks prior to beginning fill placement, provide narrative description and drawings depicting the means and methods of performing work, including, but not limited to:

- Proposed methods for preventing interference with or damage to existing underground and overhead utility lines, and other man-made facilities and natural features designated to remain within or adjacent to the construction rights-of-way.

- A complete listing of major equipment used to excavate, blend, and transport the borrow material and to construct the embankment including excavating, moisture-conditioning, earthmoving, placing, grading, compacting, and finish-grading equipment.

MATERIALS

Unless otherwise approved by the Engineer, Zone 4 Fill and Basin Fill material shall be selected from materials obtained from required excavations as specified in Section 10-1.19 EXCAVATION of these Special Provisions. Zone 4 Fill and Basin Fill shall consist of materials classified in accordance with ASTM D 2847 as CL, CL-ML, ML, SC, SM, GM, or GC. Zone 4 fill and Basin Fill shall be free from roots and other organic matter; contamination from hazardous, toxic or radiological substances, trash and debris; and frozen materials. In addition, Zone 4 Fill and Basin Fill shall meet the following requirements:

- Based on ASTM D422, "Standard Test Method for Particle-Size Analysis of Soils", 100 percent passing a 2-inch sieve and a minimum of 10 percent passing the No. 200 sieve.
- Based on ASTM D4318, "Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils", liquid limit less than 50.

PLACEMENT

The Zone 4 Fill and Basin Fill shall be constructed along its full length and width by placement of continuous and approximately horizontal layers for the full length and width of the embankment. The maximum allowable tolerance for deviation from this requirement shall be 1.5 vertical feet between any two locations. Additionally, Zone 4 Fill in the main dam embankment adjacent to other zones shall be placed at approximately the same rate as materials in the adjacent zones in the embankment. The vertical difference between the Zone 4 Fill and adjacent zones in the embankment shall not exceed 1.0 feet vertically unless otherwise approved by the Engineer.

The end slopes of partial fill sections shall not be steeper than three horizontal to one vertical (3H:1V). When placing fill against the end of a previously placed lift or against existing slopes, the end slope of the previously constructed fill or existing slope shall be treated by slope benching and other foundation preparation procedures as shown on the plans and specified herein.

The Zone 4 Fill and Basin Fill shall be constructed to the lines, grades, and cross sections indicated on the plans and to the tolerances prescribed herein, unless otherwise directed by the Engineer. The Engineer reserves the right to increase or decrease the foundation widths and embankment slopes or to make such other changes in the embankment or backfill sections as may be deemed necessary to produce a safe structure. Changes in quantities resulting from such revisions shall not constitute justification for change in contract unit prices, except as provided for in the Variations in Estimated Quantities clause of Section 4-1.03B, Increased or Decreased Quantities, of the Standard Specifications.

Contractor shall maintain and protect the embankment in a satisfactory condition at all times until final completion and acceptance of all work under the Contract. Haul paths across partially constructed embankment shall be varied and uniformly distributed over the surface of the embankment to prevent damage to the completed portion of the embankment and/or its foundation due to concentrated haul patterns. If, in the opinion of the Engineer, the hauling equipment causes horizontal shear planes or slicken sides, rutting, quaking, heaving, cracking, or excessive deformation of the embankment or its foundation, the Contractor shall change the type and reduce the size, load, or travel speed of the hauling equipment on the embankment, and the Contractor shall

repair any damage to the embankment or embankment foundation to the satisfaction of the Engineer.

The Contractor may be required to remove, at his own expense, any Zone 4 Fill and Basin Fill placed outside of prescribed slope lines. The Contractor shall excavate and remove from the embankment any material which is unsatisfactory and shall also dispose of such material and refill the excavated area as directed, all at no cost to the District.

Zone 4 Fill and Basin Fill material shall be placed and spread in layers not more than 8 inches in uncompacted thickness. The fill shall be placed such that the gradation and distribution of materials throughout each zone of the embankment shall be free from lenses, pockets, streaks, and layers of material differing substantially in texture or gradation from surrounding material. During the placing and spreading process, the Contractor shall at all times maintain a force of workers adequate to remove all roots, debris, and oversized stone from all embankment materials.

Equipment traffic on any embankment zone shall be routed to distribute the compactive effort as much as practicable. Ruts formed in the surface of any layer of spread material shall be removed and the surface smoothed before that material is compacted.

If, in the opinion of the Engineer, the compacted surface of any layer of material is too smooth to bond properly with the next layer to be placed, the surface shall be loosened by scarifying or other approved methods before material for the next layer is placed.

The Zone 4 Fill and Basin Fill shall be moisture conditioned in the stockpile or borrow area prior to placement. The moisture content of fill material placed and spread for compaction shall meet the requirements specified under "Zone 4 Fill and Basin Fill Compaction" below. Moisture conditioning in the embankment or basin fill area is not acceptable except for minor adjustments needed as a result of work interruptions.

The materials in each layer of the fill shall contain the amount of moisture within the limits specified below or as directed by the Engineer and as necessary to obtain the required compaction. Material that is not within the specified moisture content limits during and immediately after compaction shall be moisture-conditioned and reworked to obtain the specified moisture content and recompacted or replaced with fill meeting the requirements of this Section, regardless of density.

If the top or contact surfaces of a partial fill section become too dry to permit suitable bond with additional fill to be placed thereon, loosen the dried materials by scarifying or disking to depths directed by the Engineer, dampen the loosened material to an acceptable moisture content, and recompact the loosened material in accordance with the applicable requirements herein.

If the top or contact surfaces of a partial fill section become too wet to permit suitable bond with the additional fill to be placed thereon, scarify the wet material and permit it to dry (assisted by disking or harrowing if necessary) to depths directed by the Engineer, or remove and replace the fill with fill meeting the requirements of this Section. Removed material shall be dried in the borrow area or a stockpile area and reused as fill at no additional cost to District. The material shall be dried to acceptable moisture content and shall be compacted in accordance with the applicable requirements herein.

COMPACTION

Equipment

Compaction equipment shall consist of tamping rollers suitable for the material being compacted and to achieve the required compaction as specified herein. Tamping rollers shall be equipped with cleaning fingers designed and attached to prevent the accumulation of material

between the tamping feet. The cleaning fingers shall be maintained at their full length throughout the periods of use of the roller. Tamping feet shall be maintained at a length that penetrates the entire uncompacted lift thickness. Tamping rollers shall not be operated at speeds exceeding 6 miles per hour.

If used, towed tamping rollers shall meet the following requirements:

- The two drums comprising one roller unit shall be yoked such that they can rotate relative to each other when traversing uneven surfaces.
- The use of a rubber-tired tractor for towing shall be discontinued if the tires leave ruts that prevent uniform compaction by the tamping roller.

Compaction of material in areas where it is impracticable to use a roller or tractor compaction shall be performed by the use of approved compactors specifically manufactured for work in tight quarters and shall be subject to approval by the Engineer.

Scarifiers, disks, spring-tooth or spike-tooth harrows, spreaders, and other equipment shall be suitable for use in embankment construction and approved by the Engineer. Discs shall have a minimum of two gangs hooked in tandem. The width of cut shall not be less than 12 feet. Disc blades shall be notched, shall be spaced at a minimum of 16-5/16-inches, and shall have a minimum diameter of 36 inches. If the disc blades exhibit more than 10% wear, the Engineer shall have the option to require the blades be replaced to ensure full penetration of the lift thickness. The discs shall be equipped with scrapers to prevent the accumulation of mud and debris between and on disc blades. Towed speeds shall not exceed five miles per hour and the angle of cut shall be adjustable while the tool is in operation.

Zone 4 Fill and Basin Fill Compaction

After a layer of material has been placed and spread, it shall be harrowed to break up and blend the fill materials and to obtain uniform moisture distribution. Harrowing shall be performed to the full depth of the layer with a heavy disk plow or other approved harrow. If one pass of the harrow does not accomplish the breaking up and blending of the materials, additional passes of the harrow shall be required.

When the moisture content and the condition of the layer are satisfactory, the lift shall be compacted to a minimum of 100 percent of the maximum dry density in accordance with ASTM D 698 using an approved tamping roller traversing in a direction parallel to the centerline of the embankment. In areas which are not accessible by roller, the fill shall be placed in layers not more than 4 inches in uncompacted thickness and compacted with an approved special compactor to a density equal to a minimum of 100 percent of the maximum dry density in accordance with ASTM D 698. Placing, spreading, and compacting may be performed at the same time at different points along a section when there is sufficient area to permit these operations to proceed simultaneously. Compaction equipment shall be operated such that the strip being traversed by the roller shall overlap the rolled adjacent strip by not less than 3 feet.

The moisture content of the Zone 4 Fill and Basin Fill after compaction shall be within the limits of 2 percentage points above optimum to 2 percentage points below optimum moisture content as determined by ASTM D 698.

QUALITY CONTROL

The Contractor shall establish and maintain field quality control for foundation preparation, Zone 4 Fill and Basin Fill, and other operations to assure compliance with contract requirements. The Contractor shall maintain detailed records of field quality control for all operations, including but not limited to, the following:

A. Earthwork Equipment: Type, size, number of units, and suitability for construction of the prescribed work.

B. Fill Placement: Layout, drainage, moisture control, lift thickness, oversized material removal, root removal, spreading and compacting embankment fill and backfill.

C. Grade and Cross Section: Surveys to verify that the dimensions, slopes, lines and grades conform to those shown on the Drawings.

D. Borrow Material: The Contractor shall perform sampling, testing, and inspection of borrow areas prior to and continuously during borrow material excavation and moisture conditioning, as specified herein. Sampling, testing, and inspection shall be made by a qualified geologist or geotechnical engineer with experience in identifying the soil types and soil classifications required by these special provisions. Sampling, testing, and inspections shall be made for material types, changes in materials, and moisture content to achieve placement and compaction of materials to meet these specifications.

E. Testing: The Contractor shall perform testing of the Zone 4 Fill and Basin Fill and submit test results in accordance with10-1.13 "Contractor Quality Control and Testing."

F. Progress Surveys: The Contractor shall survey the Zone 4 Fill and Basin Fill weekly, and shall provide the following to the Engineer weekly:

- Grade and cross section survey data documenting the limits of fill placed and demonstrating that the dimensions, slopes, lines, and grades conform to those shown on the plans and as specified herein.
- Calculations establishing the weekly fill placement volume and cumulative total.

TESTING

The Contractor shall perform sufficient testing to ensure that the fill is being constructed as specified. The testing program specified below shall be considered the minimum acceptable. This does not relieve the Contractor from the responsibility of performing additional testing to ensure compliance with the specifications.

A. Soil Classification: Soil classification tests shall be performed in accordance with ASTM D 2487. One initial classification test shall be required for each type of material to be utilized. As prescribed in ASTM D 2487, grain size analyses in accordance with ASTM D 422 and Atterberg limits in accordance with ASTM D 4318 shall be performed on each different soil type. The Contractor shall submit soil classification tests for every 2,000 cubic yards of each classification of fill material required in these special provisions.

B. Moisture-Density Relationships: The moisture-density relations for each classification of material utilized shall be determined in accordance with ASTM D 698 unless otherwise specified. Prior to placing any fill material, a minimum of three five-point moisture-density tests shall be performed on representative samples of the material to be used as fill. During fill placement, a minimum of one additional five-point moisture-density test shall be performed for every 4,000 cubic yards

placed. Additional tests will be required each time a new material is encountered. The moisture-density curves will be compiled to form a family of curves which will be utilized to estimate optimum properties (maximum dry density and optimum moisture content) for comparison with field density tests.

C. Moisture Content Tests: Contractor shall perform moisture content tests of the type and at the rate needed to effectively manage borrow material moisture conditioning operations in the borrow area so as to properly condition the material to within the specified moisture content prior to transporting the material to the embankment. At a minimum, one moisture content test will be performed for each 1,000 cubic yards of material placed or each lift of material whichever is more frequent. Determination of moisture content shall be performed in accordance with ASTM D 2216 as specified below for in-place density testing. ASTM D 4643 may be used to estimate the moisture content in the borrow area, but all final CQC tests shall be performed in accordance with ASTM D 2216. Fills not meeting the required specifications for moisture content shall be retested after corrective measures have been applied.

D. In-place Density Testing. The in-place density shall be determined in accordance with ASTM D 1556. Method ASTM D 2922 can be used by the Contractor to gage the progress of compaction, but once the required compaction level is achieved, the Contractor shall retest the material using ASTM D 1556. Perform at least one (1) in-place density test in accordance with ASTM D 1556 on each day of placement, for each lift of material placed, or for every 1,000 cubic yards of completed fill, whichever is more frequent. Randomly stagger the locations of the in-place density tests within the plan area of the fill. Collect a soil sample at each field density test location, adjust the moisture content uniformly throughout the sample to be dry of, but close to, the estimated optimum moisture content, and perform a one-point compaction test and a moisture content test on the soil sample. Perform the one-point compaction test in accordance with ASTM D 698. Plot the results of the one-point compaction test on the family of curves for the material type to obtain the appropriate maximum dry density for comparison with dry density obtained from the in-place density test. Fill not meeting the required specifications for in-place density shall be retested after additional compaction has been completed.

MISCELLANEOUS REQUIREMENTS

Slides and Foundation Failures

When sliding or excessive foundation deformation occurs in any part of the embankment prior to final acceptance of all work under the contract, the Contractor shall repair the slide as directed by the Engineer. When the slide is caused through the fault of the Contractor, the repair shall be made at no cost to the District. When the slide is not the fault of the Contractor, an equitable adjustment in the contract price shall be made in accordance with Section 4-1.03D, Extra Work, of the Standard Specifications to cover the cost of the repairs.

Compaction Adjacent to Structures and Utilities

Equipment for spreading and compacting fill shall not be operated within 5 feet of existing structures or utilities, except as otherwise specified herein. Material within 5 feet of structures or utilities shall be compacted using appropriate special compactors approved by the Engineer.

MEASUREMENT

The quantity of Zone 4 Fill and Basin Fill to be paid for will be measured by the cubic yard to the neat embankment lines shown on the project plans or as approved by the Engineer.

PAYMENT

Full compensation for Zone 4 Fill and Basin Fill shall be considered as included in the unit price bid for Zone 4 Fill and Basin Fill and no additional compensation shall be allowed therefor.

The price bid per cubic yard for Zone 4 Fill and Basin Fill shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in Zone 4 Fill and Basin Fill, as shown on the plans, as specified herein, and as directed by the Engineer. Payment for Zone 4 Fill and Basin Fill shall include all costs associated with borrow investigations and selecting, processing, moisture conditioning, transporting, placing, spreading, compacting, and testing the Zone 4 Fill and Basin Fill as shown on the plans and as specified herein.

10-1.27 ZONE 5 FILL – AGGREGATE BASE

[District and GEI Specification]

Aggregate base shall conform to Section 26, "Aggregate Bases" of the Standard Specifications and these special provisions.

MATERIALS

Aggregate base shall conform to the grading specified for the three-quarter inch (3/4") maximum aggregate size and shall be Class 2. Material may not include reclaimed material. The second and third sentences of the first paragraph under Section 26-1.02A Class 2 Aggregate Base of the Standard Specifications shall not apply.

PLACEMENT AND COMPACTION

At locations shown on the plans, the Contractor shall construct the aggregate base maintenance road. The work to be performed shall include grading the subgrade to provide the cross-slope shown on the plans, furnishing, placing, and compacting the aggregate base, furnishing and applying water needed for compaction, and finish grading of the road surface and all other necessary grading, all as specified in Section 26, "Aggregate Bases" of the Standard Specifications. The relative compaction of compacted aggregate base material shall not be less than 95 percent.

MEASUREMENT

The quantity of Zone 5 Fill to be paid for will be measured by the cubic yard to the neat lines shown on the project plans or as approved by the Engineer.

PAYMENT

Full compensation for Zone 5 Fill shall be considered as included in the unit price bid for Zone 5 Fill and no additional compensation shall be allowed therefor.

The price bid per cubic yard for Zone 5 Fill shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in Zone 5 Fill, as shown on the plans, as specified herein, and as directed by the Engineer. Payment for Zone 5 Fill shall include all costs associated with procuring, processing, moisture conditioning, transporting,

placing, spreading, compacting, and testing the Zone 5 Fill as shown on the plans and as specified herein.

10-1.28 ZONE 6 FILL – STRUCTURE BACKFILL

[District and GEI Specification]

Earthwork for Zone 6 Fill shall conform to Section 19-3.06, "Structure Backfill" of the Standard Specifications and these Special Provisions.

Work in this section shall include selecting Zone 6 Fill from required excavations and processing, moisture conditioning, transporting, placing, spreading, compacting, and testing the Zone 6 Fill as shown on the plans and as specified herein.

SUBMITTALS

At least 3 weeks prior to beginning fill placement, provide narrative description and drawings depicting the means and methods of performing work, including, but not limited to:

- Proposed methods for preventing interference with or damage to existing underground and overhead utility lines, and other man-made facilities and natural features designated to remain within or adjacent to the construction rights-of-way.
- A complete listing of major equipment used to excavate, blend, and transport the borrow material and to construct the embankment including excavating, moisture-conditioning, earthmoving, placing, grading, compacting, and finish-grading equipment.

MATERIALS

Zone 6 Fill shall be selected from materials obtained from required excavations and shall consist of materials classified in accordance with ASTM D 2847 as SC, SM, GM, or GC, and free from roots and other organic matter; contamination from hazardous, toxic or radiological substances, trash and debris; and frozen materials. Zone 6 Fill shall have 100% passing the 3-inch sieve, less than 50% passing the No. 200 sieve, a plasticity index less than or equal to 13, and a liquid limit less than 50.

PLACEMENT

The Zone 6 Fill shall be constructed along its full length and width by placement of continuous and approximately horizontal layers for the full length and width of the fill. Zone 6 Fill shall be placed evenly on opposite sides of structures such that the difference in fill height does not exceed 2 feet.

The Zone 6 Fill shall be constructed to the lines, grades, and cross sections indicated on the plans and to the tolerances prescribed herein, unless otherwise directed by the Engineer. The Engineer reserves the right to increase or decrease the foundation widths and embankment slopes or to make such other changes in the embankment or backfill sections as may be deemed necessary to produce a safe structure. Changes in quantities resulting from such revisions shall not constitute justification for change in contract unit prices, except as provided for in the Variations in Estimated Quantities clause of Section 4-1.03B, Increased or Decreased Quantities, of the Standard Specifications.

Contractor shall maintain and protect the fill in a satisfactory condition at all times until final completion and acceptance of all work under the Contract. Zone 6 Fill shall be placed and spread in layers not more than 8 inches in uncompacted thickness. The fill shall be placed such that the gradation and distribution of materials throughout each zone of the fill shall be free from lenses, pockets, streaks, and layers of material differing substantially in texture or gradation from surrounding material. During the placing and spreading process, the Contractor shall at all times maintain a force of workers adequate to remove all roots, debris, and oversized stone from all fill materials.

If, in the opinion of the Engineer, the compacted surface of any layer of material is too smooth to bond properly with the next layer to be placed, the surface shall be loosened by scarifying or other approved methods before material for the next layer is placed.

The Zone 6 Fill shall be moisture conditioned in the stockpile or borrow area prior to placement. The moisture content of fill material placed and spread for compaction shall meet the requirements specified under "Zone 6 Fill Compaction" below. Moisture conditioning in the fill area is not acceptable except for minor adjustments needed as a result of work interruptions.

The materials in each layer of the fill shall contain the amount of moisture within the limits specified below or as directed by the Engineer and as necessary to obtain the required compaction. Material that is not within the specified moisture content limits during and immediately after compaction shall be moisture-conditioned and reworked to obtain the specified moisture content and recompacted or replaced with fill meeting the requirements of this Section, regardless of density.

If the top or contact surfaces of a partial fill section become too dry to permit suitable bond with additional fill to be placed thereon, loosen the dried materials by scarifying or disking to depths directed by the Engineer, dampen the loosened material to an acceptable moisture content, and recompact the loosened material in accordance with the applicable requirements herein.

If the top or contact surfaces of a partial fill section become too wet to permit suitable bond with the additional fill to be placed thereon, scarify the wet material and permit it to dry (assisted by disking or harrowing if necessary) to depths directed by the Engineer, or remove and replace the fill with fill meeting the requirements of this Section. Removed material shall be dried in the borrow area or a stockpile area and reused as fill at no additional cost to the District. The material shall be dried to acceptable moisture content and shall be compacted in accordance with the applicable requirements herein.

COMPACTION

Equipment

Compaction equipment shall consist of rollers suitable for the material being compacted and to achieve the required compaction as specified herein. Compaction of material in areas where it is impracticable to use a roller or tractor compaction shall be performed by the use of approved compactors specifically manufactured for work in tight quarters and shall be subject to approval by the Engineer.

Zone 6 Fill Compaction

After a layer of material has been placed and spread, it shall be scarified to break up and blend the fill materials and to obtain uniform moisture distribution. When the moisture content and the condition of the layer are satisfactory, the lift shall be compacted to a minimum of 100 percent of the maximum dry density in accordance with ASTM D 698 using an approved tamping roller

traversing in a direction parallel to the centerline of the structure. In areas which are not accessible by roller, the fill shall be placed in layers not more than 4 inches in uncompacted thickness and compacted with an approved special compactor to a density equal to a minimum of 100 percent of the maximum dry density in accordance with ASTM D 698. Placing, spreading, and compacting may be performed at the same time at different points along a section when there is sufficient area to permit these operations to proceed simultaneously. Compaction equipment shall be operated such that the strip being traversed by the roller shall overlap the rolled adjacent strip by not less than 3 feet.

The moisture content of the Zone 6 Fill shall be within the limits of 2 percentage points above optimum to 2 percentage points below optimum moisture content as determined by ASTM D 698.

TESTING

The Contractor shall perform sufficient testing to ensure that the fill is being constructed as specified. The testing program specified below shall be considered the minimum acceptable. This does not relieve the Contractor from the responsibility of performing additional testing to ensure compliance with the specifications.

A. Soil Classification: Soil classification tests shall be performed in accordance with ASTM D 2487. One initial classification test shall be required for each type of material to be utilized. As prescribed in ASTM D 2487, grain size analyses in accordance with ASTM D 422 and Atterberg limits in accordance with ASTM D 4318 shall be performed on each different soil type. The Contractor shall submit soil classification tests for every 500 cubic yards of each classification of fill material required in these special provisions.

B. Moisture-Density Relationships: The moisture-density relations for each classification of material utilized shall be determined in accordance with ASTM D 698 unless otherwise specified. Prior to placing any fill material, a minimum of three five-point moisture-density tests shall be performed on representative samples of the material to be used as fill. During fill placement, a minimum of one additional five-point moisture-density test shall be performed for every 2,000 cubic yards placed. Additional tests will be required each time a new material is encountered. The moisture-density curves will be compiled to form a family of curves which will be utilized to estimate optimum properties (maximum dry density and optimum moisture content) for comparison with field density tests.

C. Moisture Content Tests: Contractor shall perform moisture content tests of the type and at the rate needed to effectively manage borrow material moisture conditioning operations in the borrow area so as to properly condition the material to within the specified moisture content prior to transporting the material to the embankment. At a minimum, one moisture content test will be performed for each 200 cubic yards of material placed or each lift of material whichever is more frequent. Determination of moisture content shall be performed in accordance with ASTM D 2216 as specified below for in-place density testing. ASTM D 4643 may be used to estimate the moisture content in the borrow area, but all final CQC tests shall be performed in accordance with ASTM D 2216. Fills not meeting the required specifications for moisture content shall be retested after corrective measures have been applied.

D. In-place Density Testing. The in-place density shall be determined in accordance with ASTM D 1556. Method ASTM D 2922 can be used by the Contractor to gage the progress of compaction, but once the required compaction level is achieved, the Contractor shall retest the material using ASTM D 1556. Perform at least one (1) in-place density test in accordance with ASTM D 1556 on each day of placement, for each lift of material placed, or for every 200 cubic yards of completed fill, whichever is more frequent. Randomly stagger the locations of the in-place density tests within the plan area of the fill. Collect a soil sample at each field density test location, adjust the moisture content uniformly throughout the sample to be dry of, but close to, the estimated optimum moisture content, and perform a one-point compaction test and a moisture content test on the soil sample. Perform the one-point compaction test in accordance with ASTM D 698. Plot the results of the one-point compaction test on the family of curves for the material type to obtain the appropriate maximum dry density for comparison with dry density obtained from the in-place density test. Fill not meeting the required specifications for in-place density shall be retested after additional compaction has been completed.

QUALITY CONTROL

The Contractor shall establish and maintain field quality control for foundation preparation, Zone 6 Fill, and other operations to assure compliance with contract requirements. The Contractor shall maintain detailed records of field quality control for all operations, including but not limited to, the following:

A. Earthwork Equipment: Type, size, number of units, and suitability for construction of the prescribed work.
B. Fill Placement: Layout, drainage, moisture control, lift thickness, oversized material removal, root removal, spreading and compacting backfill.
C. Grade and Cross Section: Surveys to verify that the dimensions, slopes, lines and grades conform to those shown on the Drawings.
D. Borrow Material: The Contractor shall perform sampling, testing, and inspection of borrow areas prior to and continuously during borrow material excavation and moisture conditioning, as specified herein. Sampling, testing, and inspection shall be made by a qualified geologist or geotechnical engineer with experience in identifying the soil types and soil classifications required by these special provisions. Sampling, testing, and inspections shall be made for material types, changes in materials, and moisture content to achieve placement and compaction of materials to meet these specifications.
E. Testing: The Contractor shall perform testing of the Zone 6 Fill and submit test results in accordance with10-1.13 "Contractor Quality Control and Testing."

COMPACTION ADJACENT TO STRUCTURES AND UTILITIES

Equipment for spreading and compacting fill shall not be operated within 5 feet of existing structures or utilities, except as otherwise specified herein. Material within 5 feet of structures or utilities shall be compacted using appropriate special compactors approved by the Engineer.

MEASUREMENT

The quantity of Zone 6 Fill to be paid for will be measured by the cubic yard to the neat embankment lines shown on the project plans or as approved by the Engineer.

PAYMENT

Full compensation for Zone 6 Fill shall be considered as included in the unit price bid for Zone 6 Fill and no additional compensation shall be allowed therefor.

The price bid per cubic yard for Zone 6 Fill shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in Zone 6 Fill, as shown on the plans, as specified herein, and as directed by the Engineer. Payment for Zone 6 Fill shall include all costs associated with borrow investigations and testing, processing, moisture conditioning, transporting, placing, spreading, compacting, and testing the Zone 6 Fill as shown on the plans and as specified herein.

10-1.29 SURPLUS SOIL

[GEI/ District Specification – Will need to be reviewed and revised once the final destination and use of the surplus soil is determined.]

The work for Surplus Soil shall conform to Section 19, "Earthwork" of the Standard Specifications and these special provisions.

Work for Surplus Soil includes hauling, moisture conditioning, placing, and compacting excavated soil materials not used as fill and soil removed by stripping and not used in restoration areas. Surplus soil shall be hauled to the locations shown on the plans and placed and compacted in accordance with these special provisions.

GENERAL

A. Surplus soil shall be environmentally clean earthen materials containing roots and other organic material, and environmentally clean soils from required excavations that are either unsuitable for reuse as borrow or in excess of the borrow volume required for a specific fill material type.
B. In general, the maximum height of fill placement in surplus soil disposal areas shall be as shown on the plans or as required by the Engineer to maintain stable side slopes or prevent excessive settlement of other portions of the work. The side slope of this surplus soil fill shall be no steeper than 4 horizontal to 1 vertical.
C. The surface of surplus soil disposal areas shall be free from sharp ridges, gullies, potholes, sinkholes, and any other surface irregularities that may interfere with surface drainage. The surplus soil shall be placed uniformly over a large area to avoid mounding and shall be sloped for drainage. The surplus soil disposal area shall be evenly and uniformly graded to blend smoothly with the adjacent land. Final grading of the surplus soil disposal areas shall be approved by the Engineer.

PLACEMENT AND COMPACTION

The requirements for placement and compaction of surplus soil shall include:

A. Surplus soil shall be placed and spread in layers not more than 12 inches in uncompacted thickness.
B. The moisture content of surplus soil shall be controlled such that hauling, spreading, and compacting equipment can operate normally without excessive rutting or heaving of the fill. The moisture content shall be as required to obtain the specified compaction.
C. After a layer of surplus soil has been dumped and spread, it shall be harrowed to break up and blend the fill materials and to obtain uniform moisture distribution. Harrowing shall be

performed with a heavy disk plow or other approved harrow to the full depth of the layer. If one pass of the harrow does not accomplish the breaking up and blending of the materials, additional passes of the harrow shall be required, but in no case, will more than three passes of the harrow on any one layer be required for this purpose. When the moisture content and the condition of the layer are satisfactory, the lift shall be compacted to a minimum of 95 percent of the maximum dry density in accordance with ASTM D 698. Placing, spreading, sprinkling, and compacting may be performed at the same time at different points along a section when there is sufficient area to permit these operations to proceed simultaneously. Compaction equipment shall be operated such that the strip being traversed by the roller shall overlap the rolled adjacent strip by not less than 3 feet.

TESTING

The Contractor shall perform sufficient testing to ensure that the surplus soil fill is being constructed as specified. The testing program specified below shall be considered the minimum acceptable. This does not relieve the Contractor from the responsibility of performing additional testing to ensure compliance with the specifications.

A. Soil Classification: Soil classification tests shall be performed in accordance with ASTM D 2487. One initial classification test shall be required for each type of material to be utilized. As prescribed in ASTM D 2487, grain size analyses in accordance with ASTM D 422 and Atterberg limits in accordance with ASTM D 4318 shall be performed on each different soil type. The Contractor shall submit soil classification tests for every 5,000 cubic yards of each classification of fill material required in these special provisions.

B. Moisture-Density Relationships: The moisture-density relations for each classification of material utilized shall be determined in accordance with ASTM D 698 unless otherwise specified. Prior to placing any fill material, a minimum of three five-point moisture-density tests shall be performed on representative samples of the material to be used as fill. During fill placement, a minimum of one additional five-point moisture-density test shall be performed for every 10,000 cubic yards placed. Additional tests will be required each time a new material is encountered. The moisture-density curves will be compiled to form a family of curves which will be utilized to estimate optimum properties (maximum dry density and optimum moisture content) for comparison with field density tests.

C. Moisture Content Tests: Contractor shall perform moisture content tests of the type and at the rate needed to effectively manage borrow material moisture conditioning operations so as to achieve the specified compaction. At a minimum, one moisture content test will be performed for each 2,000 cubic yards of material placed or each lift of material whichever is more frequent. Determination of moisture content shall be performed in accordance with ASTM D 2216 as specified below for in-place density testing. ASTM D 4643 may be used to estimate the moisture content in the borrow area, but all final CQC tests shall be performed in accordance with ASTM D 2216. Fills not meeting the required density due to excessively high or low moisture content shall be retested after corrective measures have been applied.

D. In-place Density Testing. The in-place density shall be determined in accordance with ASTM D 1556. Method ASTM D 2922 can be used by the Contractor to gage the progress of compaction,

but once the required compaction level is achieved, the Contractor shall retest the material using ASTM D 1556. Perform at least one (1) in-place density test in accordance with ASTM D 1556 on each day of placement, for each lift of material placed, or for every 2,000 cubic yards of completed fill, whichever is more frequent. Randomly stagger the locations of the in-place density tests within the plan area of the fill. Collect a soil sample at each field density test location, adjust the moisture content uniformly throughout the sample to be dry of, but close to, the estimated optimum moisture content, and perform a one-point compaction test and a moisture content test on the soil sample. Perform the one-point compaction test in accordance with ASTM D 698. Plot the results of the one-point compaction test on the family of curves for the material type to obtain the appropriate maximum dry density for comparison with dry density obtained from the in-place density test. Fill not meeting the required specifications for in-place density shall be retested after additional compaction has been completed.

MEASUREMENT

The quantity of surplus soil to be paid for will be measured by the cubic yard based on a survey of the surplus soil disposal area. The ground surface of the surplus soil disposal area shall be surveyed prior to placing surplus soil to determine the actual volume placed.

PAYMENT

Full compensation for Surplus Soil shall be considered as included in the unit price bid for Surplus Soil and no additional compensation shall be allowed therefor.

The price bid per cubic yard for Surplus Soil shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in Surplus Soil, as shown on the plans, as specified herein, and as directed by the Engineer. Payment for Surplus Soil shall include all costs associated with borrow investigations and testing, processing, moisture conditioning, transporting, placing, spreading, compacting, and testing the Surplus Soil as shown on the plans and as specified herein.

10-1.30 ROCK SLOPE PROTECTION

[District and GEI Specification]

Rock slope protection shall conform to Section 72, "Slope Protection" of the Standard Specifications, the plans, and these Special Provisions.

Rock slope protection material shall conform to the grading specified in paragraph 72-2, "Rock Slope Protection" and shall meet the grading requirements designated on the plans.

CONSTRUCTION

Install geosynthetic fabric for rock slope protection under Section 72-2.025 "Rock Slope Protection Fabric" of the Standard Specifications. Rock Slope Protection Fabric shall meet the requirements of paragraph 10-1.31 "Rock Slope Protection Fabric" of these special provisions.

Install rock slope protection using Method B Placement under 72-2.03, "Placing" of the Standard Specifications.

MEASUREMENT

The quantity of Rock Slope Protection to be paid for will be measured by the ton based on weight tickets or as approved by the Engineer.

PAYMENT

Full compensation for Rock Slope Protection shall be considered as included in the unit price bid for Rock Slope Protection and no additional compensation shall be allowed therefor.

The price bid per ton for Rock Slope Protection shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in furnishing and placing Rock Slope Protection, as shown on the plans, as specified herein, and as directed by the Engineer.

10-1.31 ENGINEERING FABRICS

[District and GEI Specification]

Engineering fabrics shall conform to Section 88, "Engineering Fabrics," the plans, and these special provisions.

DESCRIPTION

Engineering fabrics shall be used as a separator beneath riprap rock slope protection and aggregate base, as part of articulated concrete block systems, and as filter fabric for underdrains.

SUBMITTALS

At least 2 weeks prior to delivery of the proposed engineering fabric to the site, the following shall be submitted to the Engineer for approval:

A. Certification: The Contractor shall provide a certificate stating the name of the manufacturer, product name, style number, chemical composition of the filaments or yarns and other pertinent information to fully describe the engineering fabric. The Certification shall state that the furnished engineering fabric meets MARV requirements of the specification as evaluated under the Manufacturer's quality control program. The Certification shall be attested to by a person having legal authority to bind the Manufacturer.
B. Sample: Provide a product sample having the dimensions of 4 inches by 7 inches or larger.
C. Product Data Sheet: Summary of engineering properties and other technical data.
D. Manufacturer's Instructions: Manufacturer's installation instructions and general recommendations.

MATERIAL

Rock Slope Protection Fabric

Rock slope protection fabric shall be used beneath rock slope protection and beneath aggregate base where shown on the plans and as specified in these special provisions.

Rock slope protection fabric shall meet the requirements specified in Section 88, "Engineering Fabrics" of the Standard Specifications. Unless otherwise shown on the plans, rock slope protection fabric shall be nonwoven, Type B as specified in paragraph 88-1.04, "Rock Slope Protection Fabric" of the Standard Specifications. In addition, the rock slope protection fabric shall be

designed for separation and shall meet the requirements for geotextile Class 2 in accordance of AASHTO M288, *Geotextile Specifications for Highway Applications.*

Filter Fabric

Filter fabric shall be used as a filter for underdrains and drainage layers beneath concrete structures as shown on the plans and as specified in these special provisions.

Filter fabric shall meet the requirements specified in Section 88, "Engineering Fabrics" of the Standard Specifications. Unless otherwise shown on the plans, filter fabric shall be as specified in paragraph 88-1.03, "Filter Fabric" of the Standard Specifications. In addition, filter fabric shall have an Apparent Opening Size (AOS) of 0.212 millimeters (#70 sieve) as determined by ASTM D4751, *Standard Test Method for Determining Apparent Opening Size of a Geotextile.*

Engineering Fabric for Articulated Concrete Block (ACB) Revetment System

Engineering fabric used below the ACB shall be a woven fabric, and shall meet the requirements specified in the table below. The property values (except for AOS) represent minimum average roll values (MARV) in the weakest principal direction.

ENGINEERING FABRIC FOR ACB PHYSICAL PROPERTIES

PROPERTY	VALUE	TEST METHOD
Grab Tensile, lbs.	250	ASTM D 4632
Tear Strength, lbs.	90	ASTM D 4533
Puncture Strength,	90	ASTM D 4833
Permittivity, 1/sec	0.5	ASTM D 4491
Apparent Opening Size (U.S. Sieve)	70	ASTM D 4751
Ultraviolet Stability	5 0%	ASTM D 4355

MANUFACTURER QUALITY CONTROL

The engineering fabric manufacturer shall have in place a proven quality control program. At a minimum, the quality control program shall include the following:

A. Sampling shall be done in accordance with ASTM D 4354, "Standard Practice for Sampling of Geosynthetics for Testing." Samples shall be tested according to ASTM standards for fabric mass/unit area, grab tensile strength, trapezoidal tear strength, and puncture resistance. Test results shall be made available to the Engineer.

B. Manufacturing Quality Control: Testing shall be performed at a an ISO 9001 certified laboratory accredited by Geosynthetic Accreditation Institute-Laboratory Accreditation Program (GAI-LAP) and the American Association for Laboratory Accreditation (A2LA) for tests, at frequency meeting or exceeding ASTM D 4354.

C. Ultraviolet Stability shall be verified on the proposed engineering fabric or a engineering fabric of similar construction and yarn type. Ultraviolet Stability shall be verified by an independent laboratory.

DELIVERY, STORAGE, HANDLING, AND INSTALLATION

Proper delivery, storage, handling, and installation are critical for maintaining the integrity and long term performance of the engineering fabric. Installation shall be in accordance with applicable sections of the Standard Specifications and the requirements of these Special Provisions. The following minimum requirements shall be met:

A. Labeling, shipment, and storage shall follow ASTM D 4873. Product labels shall clearly show the manufacturer or supplier name, style name, and roll number. Each roll shall be externally tagged for easy field identification. External tagging shall include the name of the manufacturer, product type, product grade, log number, and material dimensions (length and width).

B. Each roll shall be wrapped with a material that shall protect the engineering fabric from damage due to shipment, water, sunlight, and contaminants.

C. During storage, rolls shall be elevated off the ground and adequately covered to protect them from the following: site construction damage, precipitation, extended ultraviolet radiation including sunlight, chemicals that are strong acids or strong bases, flames including welding sparks, excess temperatures, and any other environmental conditions that may damage the physical property values of the geogrid. Rolled materials may be laid flat or stood on end.

D. Excessive mud, wet concrete, epoxy, or other deleterious materials shall be prevented from coming in contact with and affixing to the engineering fabric.

E. Engineering fabric materials shall not be left directly exposed to sunlight for a period longer than the period recommended by the Manufacturer.

F. Engineering fabric shall be installed in accordance with the installation guidelines provided by the Manufacturer or as directed by the Engineer. On slopes, engineering fabric shall be laid so the primary strength direction (typically the machined direction) is placed in the direction of the slope.

G. At the time of installation, the engineering fabric shall be rejected by the Contractor if it has defects, rips, holes, flaws, deterioration or damage incurred during manufacture, shipping, storage or handling. Defective, damaged, or deteriorated engineering fabric shall be removed from the site and replaced or repaired, as directed by the Engineer, at no additional cost to the District. To repair damaged areas, the Contractor shall place engineering fabric over an area extending three feet beyond the perimeter of the tear or damage.

H. Place the engineering fabric in such a manner that placement and compaction of the aggregate or fill material to cover the engineering fabric shall not excessively stretch or tear the engineering fabric. The engineering fabric shall be laid smooth and free of tension, stress, folds, wrinkles or creases.

I. The engineering fabric shall not be placed through standing water.

J. Where lap splices are allowed by the Engineer, the lap splice shall provide a minimum of 24 inches of overlap for adjacent sheets. Lap splices will not be allowed perpendicular to slopes.

K. If splicing is required on a slope and perpendicular to the slope and is allowed by the Engineer, splices shall be achieved by mechanical connection as recommended by the Manufacturer to develop the full strength of the fabric. If the Contractor elects to use sewn seams, the seam shall be a J-type seam with a "lock type" stitch for all seams. The Contractor shall double sew all seams and place all sewn seams with the seam up.

L. The Contractor shall protect the engineering fabric at all times during construction from contamination by surface runoff. Any engineering fabric so contaminated shall be removed and replaced by the Contractor with uncontaminated engineering fabric.
M. The engineering fabric shall not be left uncovered by the Contractor for more than 7 days.
N. Material in contact with the engineering fabric shall be placed, spread and compacted in such a manner as to minimize the development of wrinkles in and/or movement of the engineering fabric.
O. Aggregate, rock slope protection, or other cover placed on the engineering fabric shall not be dropped from a height of greater than 3 feet.
P. Unless approved by the Engineer, vehicles shall not be allowed to travel over engineering fabrics. If travel is allowed, a minimum fill thickness of 9 inches is required prior to the operation of tracked vehicles over the engineering fabric. Turning of tracked vehicles shall be kept to a minimum to prevent tracks from displacing the fill and damaging the engineering fabric. Rubber tired equipment may pass over the engineering fabric at low speeds, less than 5 mph. Sudden braking and sharp turns shall be avoided.

MEASUREMENT

The quantity of rock slope protection fabric to be paid for will be measured by the square yard as measured to the lines shown on the project plans and as approved by the Engineer. Rock slope protection fabric overlaps are considered incidental to the pay item and shall not be measured.

The quantity of engineering fabric for articulating concrete block revetment systems is included with the articulating concrete block revetment system and no separate measurement will be made. The quantity of filter fabric for underdrains is included with the underdrains and no separate measurement will be made.

PAYMENT

Full compensation for rock slope protection fabric shall be considered as included in the unit price bid for rock slope protection fabric and no additional compensation shall be allowed therefor. The contract price paid per square yard for rock slope protection fabric include full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all the work involved in installing the rock slope protection fabric.

Payment for furnishing and installing the engineering fabric for articulating concrete block revetment is included with payment for articulating concrete block revetment system, and no separate payment will be made.

Payment for furnishing and installing the filter fabric is included with payment for underdrain installation, and no separate payment will be made.

10-1.32 UNDERDRAINS

[District and GEI Specification]

Underdrains shall conform to Section 68, "Subsurface Drains" of the Standard Specifications, the plans, and these special provisions.

Underdrain material shall conform to the following:

- Filter fabric for underdrains shall meet the requirements for "Filter Fabric" in section 10-1.31, "Engineering Fabrics"

- Permeable materials shall conform to the requirements for Class 1, Type A Permeable Material in Section 68 of the Standard Specifications.
- Piping materials shall be smooth-wall polyvinyl plastic pipe meeting the requirements of Section 68 of the Standard Specifications.

MEASUREMENT

The quantity of underdrain will be measured by the linear foot along the line of the pipe. The length to be paid will be the slope length of the pipe designated by the Engineer. Cleanouts, fittings, air vents, and other appurtenances will not be measured separately.

PAYMENT

Full compensation for underdrains shall be considered as included in the unit price bid for underdrains and no additional compensation shall be allowed therefor.

The contract price paid per linear foot for underdrain shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in installing the underdrains, including filter fabric, permeable material, piping, and all appurtenances.

10-1.33 SURVEY MONUMENTS

Survey monuments shall conform to Section 81, "Monuments" of the Standard Specifications, these special provisions, and the plans.

This work shall consist of constructing the cast-in-place survey monuments as shown on the plans and as provided in these special provisions.

MATERIALS

- The concrete portion of the monuments shall be constructed in conformance with the provisions in Section 51, "Concrete Structures," and 90, "Portland Cement Concrete."
- Concrete shall be Class 3 or minor concrete at the option of the Contractor. A one inch maximum aggregate shall be used.
- Survey marker disks, frame, and cover shall be as shown on the plans and shall be provided by the Contractor.

MEASUREMENT

The quantities of each monument will be paid for as units determined from actual count of constructed survey monument as shown on the plans.

PAYMENT

Full compensation for Survey Monuments shall be considered as included in the unit price bid for Survey Monuments and no additional compensation shall be allowed therefor.

The contract unit prices paid for survey monuments shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in constructing the settlement monuments, complete in place, including frames and covers, excavating and backfilling holes, and disposing of surplus excavated material, as shown on the plans, and as specified in the special provisions, and as directed by the Engineer.

10-1.34 ARTICULATED CONCRETE BLOCK REVETMENT SYSTEM

[GEI Specification]

Articulated concrete block revetment system shall conform to these special provisions, the plans, and as directed by the Engineer.

DESCRIPTION

The work includes furnishing and installing the articulating concrete block (ACB) revetment system including engineering fabric, bedding, geogrid where indicated on the plans, and articulating concrete block revetment in accordance with these special provisions and as shown on the plans.

The ACB revetment system is a matrix of interconnected concrete block units for erosion protection. Units are connected by geometric interlock and cables and as required the system includes a gravel bedding layer, and an engineering fabric underlayment for subsoil retention. A geogrid is also required to retain the gravel bedding layer under the tapered blocks in a portion of the spillway channel as shown on the plans.

SUBMITTALS

The Contractor shall be submit the following for approval at least three weeks before any work described in this section commences:

A. Installation Drawings: Drawings shall be submitted that show details of the ACB, gravel bedding, geogrid, and engineering fabric installation. The details shall show the block layout patterns in relation to the feature alignment, anticipated locations of cast-in-place concrete joints, mattress junction details, and proposed installation methods for void filling materials.

B. Product Technical Data: Descriptive technical data shall be submitted on the blocks, cables, cable fittings, geogrid, and engineering fabric. The submittal shall include all material properties specified under paragraph PRODUCTS. Catalog cuts, technical data sheets, or test data shall be submitted showing that the products meet the plans and these special provisions. The submittal shall also include a copy of any standard manufacturer's warranties for the products.

GENERAL

A. To limit ultraviolet light exposure of the geogrid and engineering fabric, the blocks shall generally be placed within 7 days after placing the geogrid or engineering fabric, and the void filler shall generally be placed within 14 days after placing the geogrid.

B. Contractor shall check products upon delivery to assure that the proper material has been received and is undamaged. For engineering fabric, the guidelines presented in ASTM D 4873 and under 10-1.31, "Engineering Fabrics" of these special provisions shall be followed. For geogrid, the guidelines presented in ASTM D 4873 and this section of the special provisions shall be followed.

ACB shall meet the following requirements:

a) All blocks shall be sound and free of defects that would interfere with proper placement or that would impair the strength or longevity of the installation. Blocks with any of the following defects shall be discarded:

1) Blocks with broken appendages.
2) Blocks with chips larger than 2 inches in any dimension.
3) Blocks with cracks wider than 0.02 inches and longer than 33% of the nominal height.

b) Minor cracks incidental to the usual method of manufacture or chipping that results from customary methods of handling in shipping, delivery and placement will not be deemed grounds for rejection. Blocks shall be stored in a suitable location away from mud, paint, wet cement, and other contamination or disturbance.

PRODUCTS

Articulating Concrete Block (ACB)

A. ACB shall consist of cable tied concrete block interconnected by flexible cables running through the blocks. Each block shall be penetrated by a cable that allows articulation of the blocks, but restrains removal of individual blocks. Void filler shall be placed to inhibit lateral movement, increase hydraulic stability, and allow establishment of a vegetation cover. Articulating concrete block, cables, and fittings shall be fabricated into mattresses at the manufacturer's plant. The ACB shall be Armorflex 40 and 40T as shown on the plans or approved equal.

B. Articulating concrete block shall be wet cast using concrete as specified herein, or dry-cast by a vibratory block forming machine. The blocks shall be manufactured to the following requirements:
   a. The minimum compressive strength shall be 4000 psi for an average of 3 units and 3500 psi for an individual unit. Compressive strength shall be determined by ASTM C 42 for wet cast blocks or by ASTM C 140 for dry cast blocks.
   b. The maximum water absorption for dry cast units shall be 9 pcf for an average of 3 units and 12 pcf for an individual unit. Water absorption shall be determined by ASTM C 140.
   c. Wet cast concrete shall be air entrained to contain between 4 and 7 percent total air.

Engineering Fabric for Articulated Concrete Block (ACB) Revetment System

Engineering fabric used as a filter below the ACB shall meet the requirements of section 10-1.31, "Engineering Fabric for Articulated Concrete Block (ACB) Revetment System" of these special provisions.

Geogrid for Articulated Concrete Block (ACB) Revetment System

Geogrid used below articulated blocks as shown on the plans shall be a biaxial geogrid consisting of Tensar BX1100 or approved equal.

If an alternate geogrid is selected, provide a sample of the geogrid and certification from the manufacturer demonstrating that the alternate geogrid has properties that are equal to or better than the Tensar BX1100.

Each roll of geogrid shall be externally tagged for easy field identification. External tagging shall include name of Manufacturer, product type, product grade, lot number, and physical dimensions (length and width).

Store rolls of geogrid in a manner which protects them from damage prior to installation. Protect geogrid from coming into contact with potentially deleterious or corrosive materials.

Gravel Bedding

Gravel bedding for ACB shall consist of angular gravel, crushed gravel, or crushed rock. Gravel bedding material shall conform to the gradation requirements for the 1 ½" x ¾" primary aggregate size specified in Section 90-3.02, "Coarse Aggregate Grading" of the Standard Specifications. In addition to the gradation requirements in the Standard Specifications, the gravel bedding shall have less than 5% passing the No. 200 sieve.

Cable

A. Cable used for preassembled mattresses shall be sufficiently sized and fastened for the size/weight of the assembled mattresses such that the assembled mattresses can be placed in compliance with OSHA standards. The manufacturer shall be responsible for determining the minimum cable strength compatible with the mattress size for safe handling. Cable strength shall be based on a minimum factor of safety of 5, and include appropriate reduction factors for mechanically crimped cable and other fasteners. If applicable, loading conditions shall include the use of a spreader bar for placing the mattresses.

A. Cables shall be manufactured from polyester, stainless steel wire, or galvanized steel wire. Polyester rope shall be constructed of high tenacity, low elongating, continuous filament polyester fibers and shall consist of a core construction comprised of parallel fibers contained within an outer jacket or cover.

Void Filler

Void filler material shall be a soil medium suitable for growing vegetation.

INSTALLATION

Subgrade Preparation

A. The ACB revetment shall be placed on undisturbed native soils, or acceptably placed and compacted fill. The ACB shall not be placed on surfaces that contain mud, frost, or organic soils; embankment that has not met compaction requirements; or where the Engineer determines that unsatisfactory material remains in or under the subgrade.

B. The subgrade shall be graded to a smooth plane surface to ensure that intimate contact is achieved between the slope face and the engineering fabric and the gravel bedding. Grading shall be finished to a smooth surface, typical of that obtainable with a dozer and blade. In addition, a flat rigid bar or beam of nine (9) feet minimum shall be attached to the bucket of an excavator and dragged along the surface to assist in a smooth grade preparation, or method similar thereof. All deformities such as roots, grade stakes, and stones that impair the local subgrade face shall be removed. Holes, "pockmarks", slope board teeth marks, footprints, and other voids greater than 1.0 inch in depth normal to the local subgrade face shall not be permitted. No grooves or depressions greater than 0.5 inches in depth normal to the local subgrade face with a dimension exceeding 1.0 foot in any direction shall be permitted. Where such areas are evident, they shall be brought to grade by placing compacted homogeneous material. The subgrade and subgrade surface shall be uniformly compacted to a dense smooth surface. A rough surface typically obtained with a backhoe or dragline will not be acceptable.

C. Fill soils shall be compacted to the specified density in these special provisions. Incidental grading (where embankment is not otherwise specified) shall be compacted by heavy equipment or by tamping with a bucket to a density characteristic of the surrounding soils. The final surfaces accessible by compaction equipment shall be compacted with a smooth drum roller or vibratory plate tamper until there is no further evidence of consolidation. Where slopes limit operation of compaction equipment, the final surface shall be back-dragged with bladed equipment to a dense smooth surface. Localized loose or soft zones shall be corrected. Immediately prior to placing the engineering fabric, bedding, and blocks, the prepared area shall be inspected by the Engineer, the Contractor, and the manufacturer's representative. No fabric shall be placed thereon until that area has been approved by each of these parties. Any area that becomes unacceptable prior to the ACB installation shall be regraded, recompacted, or replaced at the discretion of the Engineer.

D. The grading tolerance shall be within 1 inch from the prescribed elevations with no abrupt variations that would cause unacceptable projections (greater than 0.5 inch of individual blocks.

E. The subgrade shall be maintained in a smooth condition between installation of the engineering fabric and the blocks. Windrows, stones, clods of cohesive soil, and irregularities shall be raked smooth. Ruts, rills and gullies resulting from traffic, precipitation runoff, groundwater seepage, etc. shall be corrected prior to installation of blocks.

Engineering Fabric Installation

A. The engineering fabric shall be laid flat and smooth so that it is in direct contact with the subgrade. The engineering fabric shall be free of tension, folds, and wrinkles. The placement shall be initiated at the toe of the slope and proceed to the top of slope. The number of seams and overlaps shall be minimized by selective orientation of engineering fabric panels within the limitations of maintaining a consistent pattern. Engineering fabric shall be placed immediately prior to gravel bedding and block installation.

B. Engineering fabric seams shall be continuously sewn. The minimum distance from the engineering fabric edge to the stitch line nearest to that edge shall be 3 inches. Seam strength shall meet the minimum requirements specified in AASHTO M288 for a geotextile Class 2. Quality assurance samples shall be taken at the request of the Engineer. The thread at the end of each seam run shall be tied off to prevent unraveling. Seams shall be on the top side of the engineering fabric to allow inspection. Skipped stitches or discontinuities shall be sewn with an extra line of stitching with a minimum of 18 inches of overlap.

Gravel Bed Installation

A. The gravel layer shall be placed in one lift with small rubber tired equipment at slow speed and using care to prevent damage of the engineering fabric. Sudden braking and sharp turns shall be avoided. Tracked vehicles shall not be allowed to travel directly over the engineering fabric.

B. The layer shall be compacted with two passes of a 5-ton static weight smooth-steel-drum vibratory roller.

C. The surface of the gravel bed shall be finish graded to the same requirements specified above for the subgrade. The surface shall be graded to a smooth plane surface to ensure that intimate contact is achieved between the gravel bedding and the ACB. Grading shall be

finished to a smooth surface. In addition, a flat rigid bar or beam of nine (9) feet minimum shall be attached to the bucket of an excavator and dragged along the surface to assist in a smooth grade preparation, or method similar thereof. All deformities that impair the local subgrade face shall be removed. Holes, "pockmarks", slope board teeth marks, footprints, and other voids greater than 1.0 inch in depth normal to the local subgrade face shall not be permitted. No grooves or depressions greater than 0.5 inches in depth normal to the local subgrade face with a dimension exceeding 1.0 foot in any direction shall be permitted. Where such areas are evident, they shall be brought to grade. The gravel surface shall be uniformly compacted to a dense smooth surface. A rough surface typically obtained with a backhoe or dragline will not be acceptable. No abrupt variations that would cause unacceptable projections (greater than 0.5 inch of individual blocks) shall be permitted. The gravel bed shall be maintained in a smooth condition prior to installation of the blocks. Windrows, stones, and irregularities shall be raked smooth. Ruts, rills and gullies resulting from traffic, precipitation runoff, groundwater seepage, etc. shall be corrected prior to installation of blocks.

Geogrid Installation

A. The geogrid shall be laid flat and smooth so that it is in direct contact with the gravel bed. The geogrid shall be free of tension, folds, and wrinkles. The placement shall be initiated at the toe of the slope and proceed to the top of slope. The number of seams and overlaps shall be minimized by selective orientation of geogrid panels within the limitations of maintaining a consistent pattern. The geogrid shall be placed immediately prior to block installation.
B. Geogrid splices shall be achieved by direct overlap of adjacent pieces or by mechanical connection as recommended by the manufacturer. If overlap splices are used, the overlap shall be as recommended by the manufacturer, but not less than 1.5 feet.

ACB Installation

A. All placement of blocks shall be in accordance with the manufacturer's recommendations and the Contractor's approved shop drawings. Placement of pre-assembled mattresses shall be done with mattresses attached to a spreader bar to aid in lifting, aligning and placing the mattresses. The mattresses shall be placed directly into position with a maximum space or gap between mattresses of 3 inches in excess of the nominal joint spacing of blocks within the mattress. Mattresses out of alignment shall be lifted and reset. Mattresses shall not be pushed or pulled laterally after they are in contact with the gravel bedding or geogrid. No overlapping of mats will be accepted and no blocks shall project vertically more than 0.5 inch beyond the adjacent blocks. As adjacent mats are placed, they shall be secured to each other by fastening the protruding horizontal and vertical cable connections and end cable loops together along each side of the mats. The system placement shall begin at the toe of slope and then proceed to the top of slope.
B. The exposed edges shall be backfilled and compacted until flush. The integrity of a soil backfill shall be maintained so as to insure a flush surface with the top of the blocks for its entire service life. The toe anchor trenches shall be backfilled in accordance with Manufacturer recommendations. Backfilling and compaction shall be completed in a timely manner such that no more than 500 feet of exposed units exist at any time. Toe

anchor trenches and backfilling are required along all sides of the revetment to protect from eroding under the edge of the concrete unit system.

Concrete Joints

A. Use of cast in place concrete joints shall be minimized to the extent practicable. The Engineer shall be informed of all concrete joints not shown on shop drawings prior to field placement. Joints that shall require concrete include:
   a) Joints between cable tied mattresses where the joint is 3 inches wider than the nominal joint.
   b) Joints where block interlock is discontinuous.
   c) Abutments where the ACB meets concrete lining.
   d) Any areas where there are partial blocks (to avoid small blocks with reduced hydraulic stability).

B. Field placed concrete shall be proportioned for similar strength and durability properties as the ACB concrete and shall meet applicable portions of Section 90-10, "Minor Concrete" of the Standard Specifications. All cable ties and anchoring shall be completed prior to placing concrete.

C. The ACB shall abut the concrete spillway lining in a neat appearance. Unless a specific detail is indicated on the drawings, voids shall be filled with partial blocks, and the gap shall be filled with cast-in-place concrete. The concrete shall be installed flush with the surface of the blocks and shall be float finished.

Void Filler

The voids of the articulating concrete block mats shall be filled with the specified filler material. All cable ties shall be completed prior to filling voids.

Tolerances

Maximum acceptable block projection (vertical offset from adjacent blocks) shall not exceed 0.5 inch.

PROTECTION OF WORK AND QUALITY CONTROL

A. Work shall be protected against damage from subsequent operations. Displaced or broken blocks shall be removed and replaced to conform to all requirements of this Section. Damaged material shall not be incorporated. Equipment that could crack, cause abrasion, or otherwise damage the blocks shall not be allowed on the ACB. Vehicles shall not operate on the ACB until afterplacement of void filler. Vehicle traffic on the ACB shall be restricted to light-weight rubber tired vehicles and only where intermittent access is necessary to accomplish the work. Routine haul routes shall not be established on the ACB. These allowances shall not waive the Contractor's obligation to maintain the installation until acceptance and to verify that vehicle access does not crack, or in any way damage, the ACB.

B. The Manufacturer of the concrete units shall provide construction advice during installation. The subgrade preparation, placement of engineering fabric, placement of the gravel bed, placement of geogrid where shown on the plans, placement of the blocks, and the final completed project shall be inspected and approved by a qualified representative of the Manufacturer. Contractor shall provide District a letter signed by the Manufacturer

certifying that Manufacturer has inspected the ACB installation and the completed works meet Manufacturer's installation requirements.

C. The following testing shall be performed independent of the manufacturing process, by an agency other than the Manufacturer. The ACB blocks shall be sampled and tested for compressive strength, water absorption, and unit weight. The sample frequency shall be 3 specimens for each 3000 SY.

MEASUREMENT

The quantity of Articulated Concrete Block Revetment System to be paid for will be measured by the square foot to the neat lines shown on the project plans or as approved by the Engineer. Articulated Concrete Block Revetment System includes articulated concrete block, cables, geogrid, engineering fabric, bedding gravel, concrete joints, and void filler. Quantity in anchor trenches is incidental to the neat lines shown on the project plans and will not be measured.

PAYMENT

Full compensation for Articulated Concrete Block Revetment System shall be considered as included in the unit price bid for Articulated Concrete Block Revetment System and no additional compensation shall be allowed therefor.

The prices bid per square foot for Articulated Concrete Block Revetment System shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in Articulated Concrete Block Revetment System, as shown on the plans, as specified herein, and as directed by the Engineer.

10-1.35 CONCRETE STRUCTURES

[GEI/ District Specification – GEI draft text provided for District review]

Portland cement concrete structures shall conform to the provisions in Section 51, "Concrete Structures" of the Standard Specifications, and these special provisions.

Concrete structures shall include the basin inlet structure; outlet works intake, gate shaft, reinforced concrete pipe encasement; and energy dissipator; emergency spillway overflow weir; and other concrete structures required for the work as shown on the plans and not provided for elsewhere. Concrete Structures does not include the outlet works reinforced concrete pipe, which is specified in 10-1.36, "Outlet Works Reinforced Concrete Pipe."

GENERAL

- Earth cuts shall not be used as forms except where specifically indicated or permitted.
- Embedded form ties or any metal placed for the convenience of the Contractor shall be removed to a depth of at least 2 inches below the finished surface. The ties shall be constructed so that removal of the ends can be accomplished without causing spalling of the faceds of the concrete. Cone ties shall be used at exposed faces.
- Forms and supports for beams, girders, slabs, walls, andother members which will be subjected to bending stresses shall not be removed without approval from the Engineer. Forms and supporst shall not be removed any sooner than specified in the Standard Specifiications or these special provisions.

- Concrete shall not be ordered or placed until all formwork, embedded parts, steel reinforcement, foundation surfaces, and joints involved in the placing have been inspected and approved by the Engineer. The Contractor shall give the Engineer at least 48 hours notice in advance of each concrete placement to enable this inspection.
- All concrete shall be placed in the presence of the Engineer. The Contractor shall give the Engineer at least 24 hours notice in advance of each concrete placement.
- All concrete shall be transported and placed as quickly as possible without segregation or loss of ingredients. Equipment and methods for transporting and placing concrete shall be approved by the Engineer. The Engineer reserves the right to reject equipment and placing methods which produce unsatisfactory results. Rejected equipment shall be removed from the project and replaced with acceptable equipment.
- All concrete shall be consolidated by immersion type vibrators. Vibrators may be either electric or pneumatic and shall operation at a frequency of no less than 8,000 vibrations per minute. Vibrators shall have a minimum head diameter of 2-1/2 inches except that smaller vibrators may be used in areas of reinforcing congestion as approved by the Engineer. A spare vibrator shall be provided for all placements.
- All exposed surfaces and interior surfaces of structures shall have a Class 1 surface finish in accordance with Section 51-1.18B of the Standard Specifications unless otherwise shown on the plans or identified in these special provisions.

SUBMITTALS

Attention is directed to Section 5-1.02 of the Standard Specifications.

At least 30 calendar days prior to placement of any concrete submit the proposed formwork drawings, together with applicable design computations, to the Engineer for review and approval. The drawings and calculations shall show the following:

a. Materials and details of form systems and supports.
b. Methods of form construction and erection.
c. Falsework.
d. Locations and details of shoring.
e. Locations and methods of installing embedded items, including methods used for monitoring of embedded item alignment before, during and after embedment.
f. Locations and patterns of form joints, ties, cleanouts, and other items affecting the appearance of concrete.
g. Sequence and schedule of erecting and removing formwork and shoring.

At least 15 calendar days prior to placement of expansion joint material, submit the manufacturer's certificate of compliance for expansion joint material.

MATERIALS

1. Portland cement concrete and related products shall conform to the requirements of 10-1.35A, "Portland Cement Concrete" of these special provisions.
2. Reinforcement and related products shall conform to the requirements of 10-1.35B, "Reinforcement" of these special provisions.

3. Expansion joint filler for reinforced concrete pipe encasement shall be asphalt impregnated fiber joint filler meeting the requirements of ASTM D1751.
4. Waterstops shall be as shown on the plans and as specified in Section 51-1.14, "Waterstops" of the Standard Specifications.
5. Nonshrink grout shall be ready to use non-metallic aggregate type, manufactured under rigid quality control to produce a flowable material without drying shrinkage or settlement and free of excessive bleeding, and meeting the requirements of ASTM C1107. Minimum 28 day compressive strength = 5,000 psi. For blockouts, use coarse aggregate according to the grout manufacturer's recommendations.
6. Elastomeric bearing pads and neoprene gaskets shall conform to the provisions in Section 51, "Concrete Structures" of the Standard Specifications.

MEASUREMENT

Pay quantities of concrete in structures will be measured by the cubic yard in conformance with the dimensions shown on the plans or such other dimensions as may be ordered in writing by the Engineer. No deduction will be made for the volume occupied by bar reinforcing steel. Joint seals, waterstops, pads and gaskets will be considered incidental to concrete structures and no separate measurement will be made therefor.

Bar reinforcing steel and reinforcing wire placed as reinforcement as shown on the plans or directed by the Engineer will be determined from computations based upon the calculated weight of the reinforcing steel and wire placed in accordance with the plans and specifications.

PAYMENT

All concrete involved in structures, except concrete in components of the work for which payment is made under separate contract items, will be paid for at the contract prices per cubic yard and no additional compensation shall be allowed therefor.

The contract prices paid per cubic yard shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all work involved in constructing the concrete work, complete in place, as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

Bar reinforcing steel placed as shown on the plans or as directed by the Engineer, will be paid for at the contract price per pound for bar reinforcing steel and no additional compensation shall be allowed therefor. Reinforcing wire used as reinforcing steel will be paid for as bar reinforcing steel.

10-1.35A MINOR STRUCTURES

Minor structures shall conform to the provisions in Section 51-1.02, "Minor Structures" of the Standard Specifications, these special provisions.

Minor structures shall include roadway drainage structures or other concrete structures identified as minor structures.

MEASUREMENT

Pay quantities of concrete in minor structures will be measured by the cubic yard in conformance with the dimensions shown on the plans or such other dimensions as may be ordered in writing by the Engineer. No deduction will be made for the volume occupied by bar reinforcing steel. Joint seals and waterstops will be considered incidental to concrete structures and no separate measurement will be made therefor.

Bar reinforcing steel and reinforcing wire placed as reinforcement as shown on the plans or directed by the Engineer will be determined from computations based upon the calculated weight of the reinforcing steel and wire placed in accordance with the plans and specifications.

PAYMENT

All concrete involved in minor structures, except concrete in components of the work for which payment is made under separate contract items, will be paid for at the contract prices per cubic yard and no additional compensation shall be allowed therefor.

The contract prices paid per cubic yard shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all work involved in constructing the concrete work, complete in place, as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

Bar reinforcing steel placed as shown on the plans or as directed by the Engineer, will be paid for at the contract price per pound for bar reinforcing steel and no additional compensation shall be allowed therefor. Reinforcing wire used as reinforcing steel will be paid for as bar reinforcing steel.

10-1.35B PORTLAND CEMENT CONCRETE

Portland cement concrete shall be shall conform to the provisions of Section 90, "Portland Cement Concrete" of the Standard Specifications and these special provisions.

The concrete mix shall be designed by the Contractor in accordance with these special provisions and the Standard Specifications. Concrete shall be Class 2 concrete and shall be designed to have a minimum unconfined compressive strength of 4,000 psi. Pozzolan shall conform to ASTM C 618, Class F.

Concrete surfaces shall be initially cured using the water method in accordance with Section 90-7.01A of the Standard Specifications. After 7 days, uniformly apply two layers of curing compound to all temporarily and permanently exposed surfaces. Curing compound shall be white-pigmented and shall conform to ASTM C309, Type 1-D or Type 2.

SUBMITTALS

A. Sources of Materials:

1. Within 15 days after receipt of NTP submit the following to the Engineer for review and approval:
   a. Source of fly ash.
   b. Source or sources of all aggregates.
   c. Manufacturer and brand name of each admixture proposed for use.
   d. Supplier or suppliers of ready-mixed concrete if its use is proposed.

   Once Engineer approval is given, the sources of all materials and mixes shall not be changed without prior approval of the Engineer.
2. At least 15 calendar days prior to placement of any concrete submit the following to the Engineer for review and approval:

a. Test reports for each lot (bin or silo) of cement from which any cement is used in the Work. Each shipment of cement shall be referenced to the lot from which the shipment is made.

b. Test data, and manufacturer's certificate of compliance with all contract requirements for all admixtures, curing compounds, and non-shrink grout proposed for use.

c. Test reports for each lot of fly ash from which any fly ash is used in the Work. Each shipment of fly ash shall be referenced to the lot from which the shipment was made.

d. Laboratory trial mixture data used for selection of mixture proportions unless otherwise waived by the Engineer.

B. Mix Designs:

1. At least 15 calendar days prior to placement of any concrete submit the proposed concrete mix design to the Engineer for review and approval together with the results of laboratory tests verifying that the mix design results in the required concrete properties. Mixtures shall be proportioned in accordance with ACI 211.1. The submittal of mixture proportions and supporting information shall follow the guidelines given in ACI 211.5R.
2. The Contractor shall prepare and submit a separate mix design for each different combination of ingredients anticipated to cover the requirements of the Work.
3. In case the source, brand, or characteristic properties of any of the ingredients need to be varied during construction, revised test reports shall be submitted. The following shall all be considered to be different sources of aggregate: different commercial sources, different borrow areas, different excavations, and significantly different rock qualities within the same excavation.

10-1.35C REINFORCEMENT

Reinforcement shall conform to the provisions in Section 53, "Reinforcement" of the Standard Specifications and these special provisions.

Reinforcement shall be deformed bars conforming to ASTM A 706 or ASTM A 615, Grade 60, unless noted otherwise. Reinforcement shall not be epoxy coated, unless noted otherwise.

Welded splices will not be allowed, unless otherwise approved by the Engineer.

Minimum clear cover shall be 2.5 inches for all bars, except where concrete is permanently exposed to earth the minimum clear cover shall be 3 inches.

Attention is directed to Section 5-1.02, "Plans and Working Drawings" of the Standard Specifications. At least 15 calendar days prior to shipment of reinforcing steel to the site, submit reinforcing details to the Engineer for approval including:

1. Detailed placing drawings showing all fabrication dimensions and locations for placing reinforcing steel and accessories.
2. Manufacturer's information for any mechanical splicing devices proposed for use in the Work.
3. If the Contractor will be furnishing bars with soft metric size designations, this shall be stated in the submittal, and a table of equivalent inch sizes shall be furnished with the submittals.

Prior to installing reinforcing, provided certified mill test reports showing chemical and physical analysis for each load of reinforcing steel delivered.

Lap splices and hooks shall be dimensioned in accordance with American Concrete Institute (ACI) 318 and as shown on the plans, but in no case shall lap splices be less than 25 bar diameters and the tail length of hooks be less than 12 bar diameters.

10-1.36 OUTLET WORKS REINFORCED CONCRETE PIPE

[GEI/Distric Specification – draft text from GEI provided for review]

Outlet Works Conduit shall be constructed from reinforced concrete pipe conforming to Section 65, "Reinforced Concrete Pipe" of the Standard Specifications, the plans, and these special provisions. Pipe shall have flexible watertight joints to prevent exfiltration and infiltration.

Submittals

A. At least 30 calendar days prior to manufacture of pipe, Contractor shall submit the following to the Engineer for review and approval:

1. Shop drawings showing full details of pipe, inlet structure, gate shaft, and outlet structure connections. Shop drawings shall show full details of reinforcement, concrete, joint dimensions (including standard and beveled joints), and materials for the pipe and gaskets. Shop drawings shall include requirements for joint compounds and associated materials to be used for assembly of the piping.
2. Certified test reports stating that concrete materials, reinforcing steel, pipe fittings, gasket seals and lubricant materials, and other products and materials comply with all applicable provisions of ASTM C76 and ASTM C443.
3. Pipe and joint mark numbering system.
4. Tabulated layout information identifying each marked piece of the piping system with reference to the locations shown on the Drawings.
5. Manufacturer's handling, storage and installation instructions.
6. Pipe installation procedures and lifting and handling plan, including details of required work areas and storage areas, equipment to be used for trench excavation, shoring, pipe installation, and concrete encasement.
7. Procedures for placing concrete under the pipe haunches and avoiding formation of a longitudinal void below the pipe.
8. Procedures and shop drawings for making field connections.
9. Material Safety Data Sheets for joint sealant materials.
10. Factory and field hydrostatic testing procedures and testing water management plan.

B. Prior to Installation of Materials:

1. Source Quality Control test results in booklet form showing all factory tests performed for each piping component.
2. Manufacturer records showing all components used in the manufacture of the pipe and their sources. Provide documentation such that all components are traceable to the source.

3. Delivery, storage, and maintenance records for materials prior to installation.

C. Upon completion of the work submit the following for approval.

1. Video tape records of completed pipe joints to the Engineer.
2. Field quality control test reports showing results of all required field quality tests to prove compliance with the plans and specifications.

Products

A. All piping shall be as specified in accordance with ASTM C76, Class IV, B-wall design, except that elliptical reinforcing will not be allowed. Piping shall be flush-jointed with tongue and groove type joints.

B. Joints and gaskets shall comply with ASTM C443. The joints shall be of the confined rubber, O-ring gasket type.

C. Lubricants used to facilitate the assembly of pipe joints shall be as recommended by the pipe manufacturer and approved by the Engineer. The lubricants shall be nontoxic, water-soluble vegetable type, and shall have no detrimental effect on the performance of the pipe gasket or joint. Petroleum based lubricants will not be allowed.

Pipe Fabrication

A. The joints shall be so designed that when the pipe is laid and the joint completed, the gasket will be confined within a groove. The contact surfaces in the joint shall be such as to not cause cutting of the rubber gasket during installation.

B. Joints shall be provided within 3 feet of the intersection between the pipe and any structure or other rigid connection. A minimum of two joints shall be provided within 8 feet of the intersection.

C. Straight pipe shall be furnished in maximum manufactured lengths of 24 feet.

Marking

A. Each length of pipe shall have all markings required for compliance with ASTM C76. In addition, each length of pipe shall have an identifying piece mark number as listed on the layout tabulations and shop drawings. The number shall be correlated to the Manufacturer's records for that pipe. The piece mark number shall be placed in a visible location on the outside of the pipe and inside the pipe at the downstream end to identify the joint during evaluation using video.

B. The top of pipe shall be identified or marked above each end. The width of the marking or identification shall not exceed 0.1 inch.

C. All beveled pipe shall be marked with the angle of the bevel, and the point of maximum pipe length shall be marked on the beveled end.

D. Markings on the outside of the pipe shall be stenciled on the pipe with a waterproof marking material in characters at least 2 inches high in a color that contrasts with the pipe. Markings on the inside of the pipe for joint identification shall be stenciled near the joint in the upper quadrant of the pipe with waterproof black paint in characters at least 1 inch wide and 6 inches high.

Source Quality Control

A. All testing and inspection of pipe fabrication shall be done by Manufacturer. The Engineer may witness any testing or inspections and may conduct independent testing or inspections. All materials and pipes are to be inspected and tested for compliance with this Section. Manufacturer shall ensure that the Engineer is given free and reasonable access to all facilities for the testing and inspection of this work, the materials, and the finished pipe.

B. When materials are received, their packaging shall be visually inspected to ensure that no contamination of the material has occurred and to verify the batch number for the material. When the material is added to the system, its batch number along with the date and time shall be recorded and become part of the quality control record.

C. Material shall be removed from storage based on their batch and age. All materials from one batch shall be consumed prior to starting a subsequent batch and oldest material shall be used first, providing it has not exceeded its shelf life.

D. Concrete shall be sampled and tested at least once every production run, but not less than once daily. Submit testing results to the Engineer for approval.

E. When the concrete pipe is moved to the post cure, the time, duration, and temperature of the post cure shall be recorded and become part of the quality control records.

F. Rejection: Material, fabricated parts, and pipe that are discovered to be defective or that do not conform to the requirements of ASTM C76 or these special provisions will be subject to rejection at any time prior to final acceptance of the pipe, at no cost to the District. Rejected material and pipe shall not be shipped or, if already delivered, shall be removed by Manufacturer from the work site within one week after rejection.

G. Manufacturer shall perform the three-edge load bearing tests per ASTM C497 on samples of the manufactured pipe selected at random and submit certified test reports to verify compliance with ASTM C76.

H. Prior to shipping, the manufacturer shall perform hydrostatic tests on three of the joints. All joints for testing shall be selected by the Engineer. Test shall include both pipe and rubber gasket joints. Manufacturer to submit proposed testing procedure for approval. Test procedure shall meet the requirements of ASTM C443.

I. All defects disclosed during inspection and all defects as the result of mechanical damage to the concrete pipe surfaces shall be repaired by Manufacturer at no expense to the District. Repair of concrete shall be in accordance with ASTM C76. Repair of joints shall be in accordance with ASTM C443.

Installation

A. General:

1. Prior to laying pipe, Contractor shall install the continuous bottom slab for the concrete encasement as shown on the drawings. The concrete encasement shall be allowed to cure for a minimum of 7 days before laying the pipe.
2. Contractor shall employ only workmen and supervisors to lay the pipe who are skilled and experienced in laying large-diameter reinforced-concrete pipe.
3. Contractor shall lay pipe in accordance with the plans, approved shop drawings, and the pipe manufacturer's recommendations. The installation shall not twist, roll, cut, crimp or otherwise injure or force the gasket out of position during joint assembly.
4. Contractor shall accurately position each pipe section so that the top-of-pipe markings line up and the pipe is aligned within the specified tolerances.

B. Survey and Tolerances: Contractor shall accurately establish the horizontal alignment and profile for the pipeline route. Pipes shall be laid to the lines, grades and elevations shown on the plans with the following tolerances.

1. Rotational Tolerance: The rotational alignment of the pipe sections shall be as recommended by the pipe manufacturer and shall be controlled so that beveled joints align properly and the inverts of adjacent sections form a smooth, continuous invert.
2. Location: Any deviations from locations shown on the plans shall require prior Engineer approval.
3. Joint Gap and Pull: Maximum allowable joint gap including gap from joint pull shall be 75 percent of the maximum recommended by the pipe manufacturer or shall be equal to or less than 1/2 inch, whichever is less.

C. Contractor shall correct any deviations that exceed the above tolerances at Contractor's expense.

D. Handling:

1. Contractor shall provide on-site storage of pipe and accessories, as required for pipeline installation, in accordance with the approved manufacturer's recommendations.
2. Contractor shall unload and handle pipe in accordance with approved manufacturer's recommendations. Pipe and accessories shall be handled with care at all times to avoid chipping, cracking, or other damage. In loading and unloading, the materials shall be lifted or moved with appropriate equipment in a manner that avoids sudden impact. Under no circumstances shall the pipe be dropped. Pipe must not be skidded or rolled against pipe already on the ground. Pipe shall be stored on a flat surface with the bell end off the ground.
3. Any pipe that is defective, or damaged during shipping, handling, or installation may be rejected if in the opinion of the Engineer is unsuitable for the project. Rejected pipe shall be clearly marked and removed from the site immediately and shall be replaced at no cost to the District.

E. Laying and Jointing:

1. Unless otherwise approved by the Engineer, work shall proceed in the upstream direction. The pipe sections shall be oriented such that the female end of each section is upstream of the male end.

2. Contractor shall use proper tools and equipment to ensure the safe and workmanlike execution of the work. Pipe shall be suspended in position using a suitable sling or other device that will not damage the pipe. Lift holes are not permitted. The laying equipment shall have sufficient capacity and stability to handle, maneuver and align the pipe throughout the laying operation.

3. Pipe shall be supported by a sling free of the blocking while the joint is being positioned for engagement. Pipe must never be struck with bucket or other equipment to drive the pipe to grade.

4. Before laying each joint of pipe, the joint surfaces shall be thoroughly cleaned by wire brushing and wiping until clean. The joint surfaces and joint gasket shall be lubricated with the approved lubricant. The gasket shall be placed in the spigot groove and the tension in the gasket shall be equalized by inserting a smooth, round rod under the gasket and moving it completely around the circumference of the joint.

5. The male end of the pipe shall be centered with the female end of the last length of laid pipe and pushed into position by application of a straight axial force. Raising the far end of the pipe so the top of the male end is inserted first, and then lowering the pipe to insert the bottom half shall not be allowed as it may result in a displaced gasket and a leaking joint. Excavating equipment shall not be used to push pipe sections together, as the force applied by such equipment can damage the pipe.

6. Immediately following assembly, the pipe joint and gasket fitting shall be checked according to manufacturer's recommendations. If the gasket is found to be displaced, the joint shall be disassembled, the gasket inspected, the joint reassembled, and the gasket position rechecked.

7. Each joint shall be inspected prior to installing the concrete encasement and again after completing the concrete encasement to make certain that the proper amount of joint engagement has been achieved. The final joint gap shall be measured to ensure that it is within the limits specified herein. Joint openings exceeding these values shall be adjusted or relayed.

8. Contractor shall follow the approved pipe installation procedure plan for placing pipe. The plan shall outline the sequence of pipe and concrete placement and proposed methods for controlling pipe flotation, lateral movement, and thermal expansion and contraction, and for maintaining design grade.

9. Pipe shall be supported in place with sandbags prior to placing concrete encasement. The Contractor may submit alternative methods of pipe support for evaluation and approval by the pipe Manufacturer and the Engineer.

10. The formation of longitudinal voids below the pipe shall be prevented by placing encasement concrete first on one side of the pipe and vibrating the concrete until it flows underneath and part way up the other side of the pipe forming a cradle. Then concrete shall be placed uniformly on both sides of the pipe to prevent lateral displacement of the pipe.

F. Interior Joint Protection:

1. After the joint is engaged, the interior joint space of all pipe sections shall be sealed.

2. Prior to the placing of sealant, any dirt or debris that has collected in the joint shall be cleaned out and the entire joint gap shall be inspected and approved for sealing.

3. Joint sealant shall be polyurethane sealant Vulkem 116 and concrete surface primer 171 as manufactured by Mameco International, Inc., or Engineer-approved equal. Contractor shall follow Manufacturer's recommendations in all grouting operations. Apply primer using extreme caution to avoid contact with the rubber gasket.

4. On completion, a careful inspection shall be made of each joint to ensure a smooth, continuous interior surface without dips or ridges between pipe sections.

5. Interior joint sealing operations shall not be conducted within two joints of pipe laying operations.

G. Grouting of the Exterior Joint Space:

1. The exterior joint space of all joints shall be grouted prior to installing the concrete encasement.

2. Grout shall be a non-shrink, ready-to-use non-metallic type grout conforming to the requirements of ASTM C1107. Contractor shall mix the grout following Manufacturer's instructions and using no more than the recommended maximum water.

3. A grout band shall be placed around the pipe and positioned to straddle the joint recess. The band shall be of sufficient length to encircle the pipe and shall be held in place on either side of the joint with steel straps so that joint mortar will be contained with little or no leakage. The band shall completely and snugly encase the outside joint except for an opening near the top where mortar grout is to be poured into the joint recess.

4. The grout shall be introduced in one operation by completely filling inside the band from one side only, until the grout rises on the opposite side. Then the grout shall be rodded or agitated on both sides of the pipe alternately to settle the grout and fill all voids.

5. After the grout band is filled and rodded or agitated, the grout shall then be left undisturbed for at least 15 minutes to allow it to mechanically stiffen and, when permeable grout bands are used, to allow excess water to seep though the band. After this period, more grout shall be added if necessary to fill the joint completely.

6. The gap at the top of the grout band shall be protected from penetration of backfill by allowing the grout to stiffen before covering the pipe.

7. The grout band shall not be removed from the joint.

8. Backfill concrete shall not be placed on either side of the pipe until after the grout band has been filled and the grout has stiffened.

9. Joint sealing operations shall not be conducted within two joints of pipe laying operations.

Field Testing and Quality Control

A. Receiving Inspection: Contractor shall verify that all materials are of the types and quantities required for the Work, are not damaged or exhibit other unsatisfactory characteristics, and are complete with all required documentation.

B. Visual Inspection: Lines shall be examined to determine that all joints are properly made up as specified herein. In addition, a detailed visual examination from both inside and outside the pipe shall be made prior to backfilling, and a visual examination of the inside shall be repeated after backfilling. The condition of each joint shall be recorded on video tape with the joint number clearly identified on the video.

C. Field Hydraulic Testing: Field hydraulic acceptance testing shall be conducted twice. Conduct the first test after the reinforced concrete pipe installation is completed, but prior to installing the concrete encasement. Conduct the section test after the concrete encasement is installed. Perform joint acceptance testing in accordance with the approved procedure. Requirements for testing include:

1. Equipment which is not to be included in the test shall be either disconnected by Contractor from the piping or isolated by test blanks.
2. Furnish all labor, tools, instruments, testing media, and equipment necessary to carry out the tests and repair all leaks.
3. Seal both ends of the pipe and fill the pipe with water at a slow rate to minimize air entrapment. The line shall be left filled for a minimum absorption period of 48 hours prior to the test. At 8-hour intervals during this period, the entire route of the section under test shall be inspected by Contractor for evidence of any leaks. Makeup water shall be added as required to maintain the line full throughout this period.
4. After the initial absorption period, pressurize the water in the pipe to 13 pounds per squre inch (psi) measured at the center of the pipe, and maintain the pressure for a minimum duration of two hours. Maintain the water level in the pipe such that the pipe remains full for the duration of the test.
5. The test shall consist of measuring the rate of leakage while the water in the pipe is pressurized. The maximum allowable leakage shall be 4 gallons over the 2-hour duration of the test. Leakage is defined as the quantity of water supplied into the pipe being tested necessary to maintain the pipe full for the duration of the test.
6. Regardless of the amount of leakage, all identified leaks shall be repaired by Contractor at no expense to Owner. If the leakage rate prior to repair exceeded the maximum allowable rate specified above, the pipe shall be retested after repairs are completed. Retest is not required after minor repairs and/or adjustment are made, if approved by the Engineer.
7. After field testing is completed and the pipe is approved, drain the pipe. System shall be vented during draining to avoid excessive vacuum. If necessary, pipe shall be blown or purged.
8. Contractor shall ensure that adequate temporary pipe restraining precautions are taken during field testing.
9. The following records shall be prepared and submitted by Contractor:
    (a) Log of leakage rates taken at 15 minute intervals for the test period.
    (b) Total leakage and average leakage over the test duration.

(c) Report of any leak including location, nature and dimension of defect, and how repaired.

Final Cleaning

Contractor shall clean gravel and debris from interior of piping after assembly is completed and prior to removing dewatering and diversion system. Contractor shall obtain the Engineer's approval of specific cleaning procedures prior to cleaning.

Remedial Work

All defects disclosed during inspection after on-site pipe acceptance by Contractor and all defects as the result of mechanical damage to the concrete pipe or damage to any facilities during construction operations shall be repaired by Contractor at no expense to Owner.

MEASUREMENT

The quantity of Outlet Works Conduit will be measured by the linear foot along the line of the pipe. The length to be paid will be the slope length of the pipe designated by the Engineer.

PAYMENT

The contract price paid per linear foot for Outlet Works Conduit shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in installing the concrete pipe. Reinforced concrete backfill around the pipe is included in the unit price paid for the pipe and no additional payment will be made therefor.

10-1.37 OUTLET WORKS GATE AND APPURTENANCES

[GEI Specification – text modified from other GEI project]

Outlet Works Gate and Appurtenances shall conform to Section 70, "Miscellaneous Facilities" of the Standard Specifications and these special provisions.

The work consists of designing, fabricating, furnishing, installing, and testing one sluice gate complete with mounting components, frame, slide, guides, stem, stem extensions, guides and supports, mounting brackets, bolts, operator and all other components as needed to make the gate a complete and operable system. This section describes the work and performance requirements related to designing, fabricating, furnishing, and installing the outlet works sluice gate, operator, stem, stem supports, crest control block, and other appurtenances shown on the plans or required for gate operation.

GENERAL REQUIREMENTS

The sluice gate shall be designed and fabricated to meet the following general requirements:

A. The gate shall be Model GH-29 Tapered-Wedge Stainless Steel Sluice Gate as manufactured by Golden Harvest, Inc. of Burlington, Washington, or approved equal.
B. The gate and all associated materials and equipment shall be designed and fabricated for heavy-duty use to ensure long-term reliable service.
C. All sluice gate parts including the operator shall be designed for the specified heads with safety factors equal or greater than those given in American Water Works Association Standard for Fabricated Stainless Steel Slide Gates (ANSI/AWWA C561-04).

D. Gate shall be square and shall be mounted in the gate shaft shown on the plans to seal the 5-foot-inside-diameter concrete outlet conduit.
E. The gate shall be mounted to the lines, grades and elevations shown on the Plans. The operator shall be mounted on a pedestal at the upstream side of the main dam crest shown on the Plans.
F. There will be no requirement for protection of gate stems and stem extensions against ice crust in the reservoir.
G. Manufacturer shall be a company specializing in the manufacture of sluice gates and gate operator with a minimum of ten years documented experience.
H. Manufacturer shall provide and maintain a quality control program acceptable to the Engineer.
I. Except as otherwise specified herein, all work shall conform to the applicable requirements of the American Water Works Association, American Welding Society, and all national, state and local laws, codes, ordinances and regulations.

PERFORMANCE REQUIREMENTS

The sluice gate, operator, and appurtenances shall be designed to meet the following performance requirements:

A. Design (seating) head shall be 25 feet.
B. Operating (seating) head shall 21 feet.
A. Under the design head the leakage across the closed gates shall not exceed 0.1 gpm per foot of seating perimeter.
D. The gate will be above the water level, continuously exposed to weather, and normally closed. Site project location is in Antioch. Long-term exposure shall not impair the gate from operational readiness.
E. When fully open the gate shall not inhibit flow into the discharge conduit and shall not reduce the capacity of the outlet conduit.
F. The operator shall be constructed so that the gate may be manually opened in 30 minutes or less at any reservoir level.
G. The gate shall provide a continuous smooth opening, without obstructions that may cause solid deposition and impede gate closing.
H. The gate design shall enable ready inspection of components and shall incorporate features allowing ease of removal and replacement of all components susceptible to corrosion or wear.

DESIGN COORDINATION

The Contractor shall coordinate the design with the District and the Engineer. The Contractor and Vendor shall be required to attend the following meetings:

A. Within 3 weeks of receiving the notice to proceed, a pre-design review meeting will be held in Martinez, CA to discuss specific design requirements with the District and the Engineer. Vendor's attendance is mandatory. The Contractor shall be responsible for contacting the District to request a meeting.
B. Following vendor's submittal of design, a design submittal review meeting will be held in Martinez to discuss the design with the District and the Engineer. Vendor's attendance is mandatory.

C. Vendor's design will be reviewed by the District, the Engineer, and DSOD. Vendor shall be available for meetings by teleconference throughout the duration of the Work.

SUBMITTALS

A. Substitutions: Prior to installation, any proposed substitution from the plans or these special provisions is to be forwarded, in writing, to the Engineer for approval, as specified in Section 8-1.04,"Substitution of Specified "Or Approved Equal" or "Or Approved Equivalent" Items," of these special provisions.

B. The Contractor shall be required to submit the following for approval:

Product Data

The Contractor shall submit the following product data:

a) Gate Data including:
   1) Gate type and size
   2) Pressure rating
   3) Frame material
   4) Stem, stem extension, and stem coupling material
   5) Seat materials
   6) Slide material
   7) Guide rail material
   8) Wedge material
   9) Thrust nut material
   10) Studs/nuts material
   11) Stem guide material
   12) Mounting bracket material
   13) Operating torque requirement (ft-lb) at 20 feet of water head
   14) Approximate net weight of all components
   15) Estimated delivery time (weeks)

b) Lift Data including:
   1) Type of lift
   2) Technical data, dimensions
   3) Torque range, ft. lbs.
   4) Operating shaft material
   5) Handwheel/wrench material/diameter
   6) External coating
   7) General arrangement drawings
   8) Estimated delivery time (weeks)

c) Manufacturer's catalog, product, and equipment data that include materials type, performance characteristics, and similar data. Indicate catalog, model, and serial numbers representing the proposed product or equipment.

Design Submittals

a) Submit the original and 5 copies of the following for review and approval within four weeks following the pre-design review meeting:

1) Flow curves: gate percent open versus flow at various heads
2) Manufacturer's certified dimensional drawings and detailed specifications. Manufacturer's drawings and specifications shall include: gate type; size; accessories; layouts, including plans, elevations, and sectional views; lift mounting; gate connection to concrete gate shaft structure; coatings; stem guide spacing; list of components and materials used in the gates and operators; connection drawing; assembly and complete installation details. The manufacturer's drawings shall show complete information necessary for fabrication, erection, inspection and testing of a complete and operable system; and shall be neat in appearance, legible, and explicit to enable proper review to ensure Contract compliance. Drawings submitted for review shall bear evidence that they have been checked. Incomplete or unchecked drawings will not be accepted.
3) A proposed list of spare parts for gate and operator.
4) Complete component information to verify compliance with specified items.
5) Manufacturer's installation instructions.
6) Recommendations and instructions that provide written detailed step-by-step preparation for installation of the products.
7) Manufacturer's quality control program.
8) Shop hydrostatic test procedure.
9) Shop drawings and supporting data for precast stem supports and dam crest control block including: documentation of design loading and certification that stem supports and dam control block can support design loading, reinforcing details, dimensions, spacing, and anchorage details for stem rods and gate control.

b) Submit the original and 5 copies of the following for review and approval at least four weeks prior to shipment:
   1) Certificate of compliance for all materials stating compliance to approved manufacturer's specifications.
   2) Certificate of factory calibration records and hydrostatic test to 110 percent of gate design head.
   3) Operation and Maintenance (O&M) Manual containing the manufacturer's operating and maintenance instructions for the gate and actuator. The O&M Manual shall include detailed procedures for the removal of a gate/operator part and the installation of the corresponding spare part.
   4) Field operational testing plan.
   5) Manufacturer's guarantee that sluice gate and operator controls perform as specified herein.
   6) Manufacturer's warrantee that material and workmanship of product are in accordance with Plans and Specifications.

c) Each Vendor submittal shall have affixed to it the following certification statement signed by the Vendor:

> "Certification Statement: By this submittal, I hereby represent that I have determined and verified all fabrication measurements, fabrication criteria, materials, dimensions, catalog numbers, and pertinent data, and I have checked and coordinated each item with other applicable approved drawings and all contract requirements."

d) If the Vendor's submittals deviate from the Plans and Specifications, the Vendor shall advise the Engineer in writing with the submittal and state the reason therefor.
e) After review and approval, if, in the opinion of the Vendor, modifications are necessary, such modifications shall be submitted in detail, including reasons for the modifications. Modifications shall not be implemented without review and approval by the Engineer.
f) Review and approval of Vendor's submittals shall not relieve the Vendor from its responsibility with regard to fulfillment of the terms of the Contract. Engineer's review will be for adherence to overall basic design, inspection, and test requirements. Correctness of dimensions, proper design and details of quantities and field fit shall be the responsibility of the Vendor.

DELIVERY

A. Vendor shall deliver all equipment in accordance with the plans and these special provisions.
B. Gate operator shall be packaged and shipped as a complete assembled unit separate from the gate. Gate shall be packaged and shipped as a complete assembled unit. Packing for shipment shall be in accordance with manufacturer's written procedures.
C. Upon receipt the Contractor shall inspect the gate and operator and notify the Engineer of any damage. Damaged equipment shall be promptly repaired or replaced at no cost to the District.

WARRANTY

Manufacturer shall guarantee that sluice gate and operator will perform as specified herein, and shall warrant that material and workmanship of product are in accordance with the Plans and Specifications.

PRODUCTS

Gate Materials and Components

A. All materials shall be new.
B. All materials of construction shall withstand the specified conditions and meet the specified performance requirements. Steel shall be Type-304 stainless steel.
C. The frame piece shall be designed for surface mounting on the concrete gate shaft structure and to provide a water tight installation.
D. Operating stems, stem extensions, and stem couplings shall be of a size to safely withstand, without buckling or permanent distortion, stresses induced by operating forces, thermal stresses and maximum possible operator loads. Stem couplings shall be of the same material as the stems. In section, couplings shall be stronger than the stems.
E. Stem guides shall be adjustable in two directions and shall hold the stem in alignment while allowing enough play to permit easy operation. Brackets shall have sufficient strength to prevent twisting or sagging under load.

Gate Operators

A. The operator shall be capable of holding the gate at any position between OPEN and CLOSE without any measurable gate drift.
B. The operator shall be designed for long operational life and high reliability with provisions for easy maintenance and replacement without removing the gate from service. The gate operator

shall be completely self-contained and shall be suitable for outdoors, above ground installation.

C. The gate operator shall provide sufficient torque to operate the gate at a differential pressure equal to the specified design head.
D. To prevent mechanical failure in the event of a seized gate, all operator components shall be designed for a minimum mechanical factor of safety of 200% of the calculated breakaway torque required for gate opening with the differential pressure across the gate equal to the specified design head.
E. The handwheel shall require a maximum of 40 pounds on the rim for seating or unseating load or of 30 pounds for running load.
F. A counter-type indicator shall be installed integrally with the gate operator housing to provide continuous local visual indication of gate position at all times.
G. Each gate operator and components shall be fully removable.

Spare Parts

A. Vendor shall prepare a proposed list of spare parts for the gate and operator. The list shall be applicable for a parts replacement period of five years. Parts needed for replacement in the five year period, but not suitable for five-year storage due to the short shelf-life of the part, shall be identified.
B. When furnished, spare parts for gates and operators shall be delivered in their original packaging.
C. Spare parts packaging shall identify the part with a corresponding gate and/or operator.

Nameplates

A. Gate shall be furnished with a nameplate permanently affixed to its operator.
B. The nameplate shall be of metallic, corrosion resistant material; plastic material and/or glued on stickers will not be accepted.
C. Gate data on the nameplate shall include the name of the gate manufacturer, gate model number, body material, seat material, rated pressure, and gate size. The gate data shall be stamped, punched, or engraved on the nameplate.

Stem Supports and Crest Control Block

A. Stem supports and crest control block shall be precast concrete sections unless otherwise approved by the Engineer.
B. Concrete stem supports and crest control block shall meet the requirements of Section 51, "Concrete Structures" of the Standard Specifications and these special provisions.

FABRICATION

A. No portion of the Work requiring a manufacturer's drawing shall be started nor shall any products be fabricated or delivered to the site prior to the written approval such item by the Engineer. Delivered products that do not conform to approved manufacturer's drawings shall be at the Vendor's risk. The District will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity.
B. Sluice gate and operator shall be fabricated according to specifications and shop drawings that have been reviewed and approved by the Engineer.

C. All parts in the sluice gate and accessories shall be manufactured accurately on mating and bearing surfaces. All parts shall conform to the design dimensions and shall be free from defects in material or workmanship. All attaching bolt holes shall be drilled accurately to layout indicated on the approved shop drawings. The seating facings shall be machined to a finish of 63 micro-inches. All mating surfaces, such as guides-to-frame and frame-to-wall thimble, shall be made flat.

TESTING

The sluice gate shall be shop tested, and the sluice gate, operator, and appurtenances shall be field tested in accordance with these special provisions.

Shop Testing

A. After completion of fabrication, all seating and wedging surfaces shall be cleaned of all foreign materials and final adjustments shall be made. All shop-assembled components shall be inspected for accurate fit. The completely assembled gate and lift shall be separately shop-operated from the fully closed to the fully open positions to ensure proper assembly and operation. The gate shall be operated in the guides and inspected to assure a straight and true sealing face parallel to the guide when the gate is in the wedged closed position. The gate shall be adjusted so that a 0.004-inch-thick gauge will not be admitted at any point between frame and cover seating surfaces.
B. A shop leakage test of the gate at 110 percent of the design head shall be performed in accordance with the approved manufacturer's procedure.
C. The gate and equipment shall be inspected and approved by a qualified shop inspector in accordance with manufacturer's quality control program prior to shipment.
D. Manufacturer shall allow witnessing of factory calibrations and tests of sluice gate and operator at manufacturer's facility and shall make them available for inspection prior to packaging for shipment. Notify the Engineer at least 14 days before calibrations are scheduled, or before the gate is packaged for shipment.

Field Testing

1. The gate manufacturer shall supply a representative for the installation and field testing of the gate.
2. The gate operator manufacturer shall supply a representative for the installation and field testing of the operator.
3. After completion of the field installation of the gate and operator, an operational test of the entire system shall be performed. At a minimum the gate shall be operated with no hydrostatic pressure and inspected to ensure a true and accurate sealing installation.
4. Upon completion of the work and at a time designated by the District, Vendor shall instruct a representative of the District in the operation, calibration, and maintenance of equipment furnished under this specification.

MEASUREMENT

Not applicable.

PAYMENT

The contract lump sum price paid for outlet works gate and appurtenances shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals for doing all the work involved in designing, fabricating, furnishing, and installing the outlet works gate and appurtenances as specified in the Standard Specifications and these special provisions, as shown on the plans, and as directed by the Engineer.

10-1.38 MISCELLANEOUS METAL

[GEI/ District Specification – text from other GEI project] (SECTION NEEDS WORK – INCLUDED AS PLACEHOLDER AND TO SHOW MEASUREMENT AND PAYMENT. SECTION TO BE UPDATED AFTER 60% DESIGN WHEN MISCELLANEOUS METAL COMPONENTS HAVE BEEN DESIGNED)

Miscellaneous Metal shall conform to the requirements of Section 75, "Miscellaneous Metal" of the Standard Specifications, these special provisions, and the plans.

The work shall consist of furnishing and installing miscellaneous aluminum, iron, and steel, except metal components which are provided for under separate components of the work, as shown on the plans or as directed by the Engineer.

Miscellaneous metal items include the stainless steel flow control plate, outlet works trash rack, gate shaft safety rack, gate shaft ladder, chain link fencing, railings, and other minor metal components. Miscellaneous metal does not include the steel bridge and appurtenances, which are specified in 10-1.39, "Bridge and Appurtenances."

MATERIALS

A. Unless otherwise specified, materials shall conform to the following specifications: (NEEDS TO BE EDITED)

Material	Specification
Steel bars, plates and shapes	ASTM Designation A 36/A 36M or A 575, A 576 (AISI or M Grades 1016 through 1030 except Grade 1017)
Steel fastener components for general applications:	
Bolts and studs	ASTM Designation A 307
Headed anchor bolts	ASTM Designation A 307, Grade B, including S1 supplementary requirements
Non-headed anchor bolts	ASTM Designation A 307, Grade C, including S1 supplementary requirements and S1.6 of AASHTO Designation M 314 supplementary requirements or AASHTO Designation M 314, Grade 36 or 55, including S1 supplementary requirements
High-strength bolts and studs, threaded rods, and non-headed anchor bolts	ASTM Designation A 325 or A 449, Type 1

Nuts	ASTM Designation A 563, including Appendix X1
Washers	ASTM Designation F 844
Stainless steel fasteners (Alloys 304 & 316) for general applications:	
Bolts, screws, nuts, studs, threaded rods, and non-headed anchor bolts	ASTM Designation F 593 or F 738M
Washers	ASTM Designation A 240 and ANSI B 18.22M
Carbon-steel castings	ASTM Designation A 27/A 27M, Grade 65-35 [450-240], Class 1
Malleable iron castings	ASTM Designation A 47, Grade 32510 or A 47M, Grade 22010
Gray iron castings	ASTM Designation A 48, Class 30B
Ductile iron castings	ASTM Designation A 536, Grade 65-45-12
Steel pipe	Commercial quality welded
Other parts for general applications	Commercial quality

B. Chain link fencing shall be 42-inch-high chain link fence in accordance with Section 80-4 "Chain Link Fence" of the Standard Specifications and as shown on the State Standard Plans.

INSTALLATION REQUIREMENTS

(ADD AS REQUIRED)

MEASUREMENT

Miscellaneous metal will be measured by the pound as determined from scale weightings.

PAYMENT

The contract prices paid per pound for miscellaneous metal shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in furnishing and installing miscellaneous metal, complete in place, as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

10-1.39 PREFABRICATED STEEL BRIDGE

[District Specification – text from District sample modified by GEI for review]

Construction of steel structures shall conform to the provisions in Section 55, "Steel Structures," of the Standard Specifications and these special provisions.

DESCRIPTION

A. The work shall consist of designing, furnishing, and installing a prefabricated girder or truss steel bridge over the basin inlet structure. The bridge shall be installed complete-in-place including the steel structure, decking, anchor bolts, bearings, railings, and other appurtenances specified herein or as required to complete the bridge installation.
B. The side walls for the basin inlet structure will serve as the abutments for the bridge and will be designed by the Engineer. The Contractor shall review the Engineer's abutment design and shall coordinate with the Engineer to determine if changes in abutment geometry or capacity are required to support the bridge.
C. The steel bridge shall have an an approximately 44-ft clear span and shall have 20-ft clear width between the guard rails. Actual clear span shall be as shown on the plans.
D. The steel bridge shall have reinforced concrete slab deck designed for HS-20 loading.

QUALITY ASSURANCE

A. Reference Standards:
    1. AASHTO: American Association of State Highway and Transportation Officials
    2. AISC: American Institute of Steel Construction
    3. ASTM: American Society for Testing and Materials
        a. A153/A153M-09 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
        b. A193/A193M-10 Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service
        c. A242/A242M-04(2009) Standard Specification for High-Strength Low-Alloy Structural Steel
        d. A325-10 Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
        e. A490-10 Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength
        f. A307-07b Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength
        g. A588/A588M-05 Standard Specification for High-Strength Low-Alloy Structural Steel with 50 ksi [345 MPa] Minimum Yield Point to 4-in. [100-mm] Thick
        h. A606-09a Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance
        i. A847-05 Standard Specification for Cold-Formed Welded and Seamless High Strength, Low Alloy Structural Tubing with Improved Atmospheric Corrosion Resistance
        j. F154-02 Standard Guide for Identification of Structures and Contaminants Seen on Specular Silicon Surfaces
        k. G101-04(2010) Standard Guide for Estimating the Atmospheric Corrosion Resistance of Low-Alloy Steels
    4. AWS: American Welding Society
        a. D1.1 Structural Welding Code

5. SSPC: Steel Structures Painting Council
    a. SSPC-SP7 Brush Off Blast Cleaning
    b. SSPC-SP10 Near White Blast Cleaning
6. CBC: California Building Code

B. Drawings:
1. For purposes of clarity and legibility, drawings are diagrammatic to the extent that many design details are not indicated unless specifically dimensioned.
2. Design of bridge and decking shall be governed by structural conditions. Contractor shall make use of data in Contract Documents
3. The contractor shall not willfully install the bridge as shown on the plans when it is obvious in the field that unknown grade differences or discrepancies in the area dimensions exist that might not have been considered in engineering. Such differences shall be brought to the attention of the Engineer. In the event this notification is not performed, the contractor shall assume full responsibility for any revision necessary.

SUBMITTALS

B. Substitutions:

Prior to installation, any proposed substitution from the plans or these special provisions is to be forwarded, in writing, to the Engineer for approval, as specified in Section 8-1.04,"Substitution of Specified "Or Approved Equal" or "Or Approved Equivalent" Items," of these special provisions.

B. Shop Drawings and Structural Calculations

1. The Contractor shall obtain and submit three (3) copies of the shop drawings and structural calculations for the proposed steel bridge to the Engineer prior to beginning fabrication. All relative design information including, but not limited to governing codes, design parameters, member sizes, bridge reactions, shop and field connection details, deck details, and general notes shall be clearly specified on the shop drawings. Shop drawings shall have cross-referenced details and sheet numbers. The Engineer will have fifteen (15) working days to review the drawings. If revisions are required, as determined by the Engineer, the contractor shall revise and resubmit the shop drawings and calculations within ten (10) working days of receipt of the Engineer's comments. The Engineer will have ten (10) working days to review the revisions. Upon the Engineer's acceptance of the shop drawings, three (3) reviewed copies of the shop drawings and calculations, incorporating the required changes, shall be submitted to the Engineer. In order to allow bridge fabrication activities to proceed, the Engineer may conditionally accept the shop drawings and calculations while minor revisions are being completed. In the event that the Engineer fails to complete the review within the time allowed, and if, in the opinion of the Engineer, completion of the work is delayed or interfered with the reason of the Engineer's delay in completing the review, the Contractor will be compensated for resulting losses, and an extension of time will be granted, in the same manner as provided for in Section 8-1.09, "Right of Way Delays" of the Standard Specifications.

2. A Professional Civil or Structural Engineer licensed in the State of California shall stamp and sign all calculations and shop drawings for the prefabricated steel bridge.

3. In addition to dead loads, the bridge and the abutment connections shall be designed for HS -20 loading, and wind load as specified by UBC.

4. Seismic Loading shall be determined as per UBC.

5. Deflection of the trusses or girders due to service live load plus impact shall be limited to L/800. Deflections in longitudinal deck members shall also be limited to L/800.

C. Inspection and Maintenance Manuals:

1. Prior to the final inspection of the bridge, the contractor shall furnish two (2) individually bound Service Manuals to the Engineer. The manuals shall contain the following:

   a. Index sheet indicating the contractor's name, address, and phone number.
   b. A copy of the completed warranty.
   c. Copies of equipment warranties and certificates.
   d. Complete inspection and maintenance instructions for all bridge components.

PROJECT COORDINATION

A. Sequencing and Scheduling

Coordinate bridge design and review process, purchase, fabrication, and installation work with the construction of other site improvements.

The sidewalls for the basin inlet structure will serve as the bridge abutments and will be designed by the Engineer. Prior to designing the bridge, the Contractor shall review the design of the abutments. Coordinate the bridge design with the Engineer to confirm that the abutment geometry and capacity are compatible with the bridge geometry and design loading conditions and that the geometry and function of the basin inlet structure are not impacted.

The Contractor shall notify the Engineer a minimum of five working days prior to beginning bridge erection.

B. Rules and Regulations:

1. All work and materials shall be in full accordance with the latest rules and regulations of the Caltrans Bridge Design Standards, California Building Code, and other applicable state or local laws or regulations. Nothing in these drawings or special provisions is to be construed to permit work not conforming to these codes.
2. The contractor shall furnish any additional material and labor required to comply with these rules and regulations, though the work is not mentioned in these special provisions or shown on the plans.
3. When the special provisions call for materials or construction of a better quality or larger size than required by the above-mentioned rules and regulations, the provision of the special provisions shall take precedence over the requirements of the said rules and regulations.

PRODUCT DELIVERY, STORAGE AND HANDLING

A. The Contractor shall coordinate the delivery and erection schedule.

B. Delivery to the job site will be by trucks.

C. The Bridge Manufacturer shall provide detailed, written instruction procedures for proper lifting and splicing of bridge components.

D. In handling and shipping of the steel work, every care should be taken to avoid bending, scraping or overstressing the pieces. All pieces bent or otherwise injured will be rejected and replaced by the Contractor with no additional compensation therefor.

E. The Contractor shall notify the Engineer five days in advance of when the bridge superstructure will be delivered to the site. Engineer shall have free access to any portion of the site where work is performed during staging and installation.

F. The loading, transporting and unloading of the bridge superstructure shall be so conducted that metal will be kept clean.

G. Bridge shall be neatly stacked on dunnage above ground to protect both the bridge and the existing ground surface where the bridge will be temporarily staged. The Contractor is directed to the "Mobilization" and "Preservation of Property," sections of these special provisions.

MATERIALS AND INSTALLATION

A. Bridge Superstructure

1. The bridge superstructure shall be a single span truss or girder type fabricated from unpainted weathering steel. The truss type bridge shall be constructed from Pratt-type trusses with parallel chords and vertical ends. If the Pratt style truss is used and has an odd number of bays, it shall have crossed diagonals in the middle bay. Crossed diagonals shall be of equal height. Unless specified otherwise, any bridge depiction shown in the Plans is conceptual only. Overhead (portal) bracing is not allowed.
2. Bridge shall be fabricated from corrosion resistant high-strength, low-alloy material meeting ASTM A242, A588, A606, or A847 with a minimum corrosion index of 5.8 per ASTM G101. Minimum thickness of tubular steel members (not including railings) shall be 1/4 inch nominal.
3. All members of the truss and deck supporting system shall be fabricated from steel hollow structural sections (HSS), with the exception that floor beams may be wide flange (W) shapes. Floor beams and stringers may be square/rectangular HSS when the truss is specified as round HSS. Open ends of end posts and floor beams shall be capped. Open shaped (non-tubular) stringers will be allowed only when the Bridge Manufacturer warranties the stringer design for 50% overload. Where water collection inside of structural tubing is possible during construction or service, weep holes shall be provided at low points.
4. Splices for truss members, bracing, and floor beams, when used, shall be made with ASTM A325 or A490 high strength bolts. Type 3 bolts shall be used. Anchor bolts shall

conform to ASTM A307, A193, or F1554. All hardware (other than type 3 high strength) shall be hot-dip galvanized in accordance with ASTM A153.

5. Field splices shall be fully bolted slip critical connections, utilizing tension-indicating washers. Tack welding of high strength hardware is prohibited. Splices not immediately at or adjacent to panel points shall be designed for 100% of the member bending moment capacity for primary compression members, and 75% for bracing members or members subject to load reversal, including slip resistance, and slip resistance shall further meet the same AASHTO required strength as with other failure modes.
6. Span length will be as shown on the plans.
7. The bridge shall be cambered to offset the calculated dead load deflection plus 1% of the bridge length.
8. For bridge abutment elevations refer to the plans.
9. Bridge width shall be 20-feet as measured from the inside face of the barrier rails.
10. The top of the top chord shall not be less than 54 inches above the deck surface for the truss type bridge.
11. Welding and weld qualification tests shall conform to the provisions of AWS D1.1. The flux core arc welding (FCAW) process, utilizing E80 electrodes with similar weathering characteristics as the base material, shall be used.
12. Nondestructive weld testing is required. All welds are to be 100% visually inspected. 10% of all fillet and partial penetration welds shall be magnetic particle tested. 100% of end of top chord to bottom chord connections shall be tested. Full penetration shop welds shall be ultrasonic tested in accordance with AWS D1.1; Section 6. Base material certifications are to be supplied by the material suppliers. Inspection test results and a certificate of compliance shall be submitted to the Engineer.
13. Portions of the bridge exposed to view shall be finished neatly. Shearing, flame cutting and chipping shall be done carefully and accurately. All sharp corners and edges, and edges that are marred, cut or roughened in handling or erection, shall be slightly rounded by grinding or other suitable means.
14. All exposed surfaces, defined as those surfaces seen from the deck and from alongside the structure, shall be blast cleaned in accordance with SSPC-SP7.
14. Finished bridge superstructure shall be true to line and free from twists, bends and open joints.

B. Decking

1. The concrete deck shall be poured by the Contractor after the bridge substructure is erected. Nominal weight concrete (145 pounds per cubic foot) with 4000-psi compressive strength in 28 days shall be used. The Contractor shall design the bridge deck so that it is compatible with the steel substructure and to accommodate the design vehicle and railing loads. However, the concrete deck shall meet the following minimum requirements:

   a. The concrete slab shall be at least 8 inches thick.
   b. The transverse reinforcing steel shall have an equivalent area greater than or equal to #5 bars at 12 inches on center top and bottom.
   c. The longitudinal reinforcing steel shall have an equivalent area greater than or equal to #4 bars at 12 inches on center top and bottom.

d. The reinforcing bars shall have a minimum of 2 inches of cover.
e. Reinforcing steel shall conform to ASTM A 615 Grade 60.

2. Decking shall be installed after the placement of the bridge on its abutments unless approved by Engineer.

C. Toe Railings and Safety System:
1. Unless otherwise approved by the Engineer, the bridge shall be supplied with Type 732 concrete barriers as shown on Caltrans Standard Plan B11-55. In addition, tubular hand railing shall be provided on the concrete barrier as shown on Caltrans Standard Plan B11-51.
2. Concrete barriers and railings shall extend full height to the end of the bridge.
3. When bridge structural members support or serve as railing members, the bridge shall be designed for the simultaneous application of rail load plus dead load plus 50% of live load.

D. Bearing Devices:
1. Bridge bearings shall consist of a steel setting or slide plate placed on the abutment. The bridge bearing plate which is welded to the bridge structure shall bear on this setting plate. One end of the bridge will be fixed by fully tightening the nuts on the anchor bolts at that end. The opposite end will have finger tight only nuts to allow movement under thermal expansion or contraction. Bearing plates and anchor bolts to be installed on the abutments shall be supplied by the bridge manufacturer.
2. The bridge bearings shall sit in a recessed pocket on the concrete abutment. Minimum 28-day strength for the abutment concrete shall be 4,000 psi. The step height (from bottom of bearing to top-of-deck) shall be determined by the bridge manufacturer.
3. Cover plates shall be provided to cover expansion gaps. Cover plates shall be of sufficient size and weight to carry bridge loads identified in these special provisions. The top edges of the cover plate shall be beveled and the plate shall be of sufficient width to cover the end gaps at all temperature extremes. The cover plate shall be made from either self weathering or galvanized steel.
4. When grout is injected under bearings, a latex modified non-shrink grout shall be used.

E. Foundations:
1. The bridge manufacturer shall determine the number, diameter, minimum grade and finish of all anchor bolts. The anchor bolts shall be designed to resist all horizontal and uplift forces to be transferred by the superstructure to the supporting foundations. Engineering design of the anchor bolt embedment, shall be the responsibility of the Contractor's Engineer. The Contractor shall provide all materials, equipment, and tools for construction of the bridge. The Contractor shall install the anchor bolts and bearing plates in accordance with the manufacturer's anchor bolt spacing dimensions.
2. Information as to bridge support reactions and anchor bolt locations will be furnished by the bridge manufacturer.

F. General:
1. The prefabricated steel bridge shall be installed in accordance with all applicable local and state codes and ordinances by a licensed contractor.

2. Follow manufacturer's installation directions. Any conflict between the manufacturer's installation directions and the plans or these special provisions shall be immediately brought to the attention of the Engineer.

INSPECTION OF SITE CONDITIONS

A. The contractor shall check and verify all size dimensions prior to proceeding with work under this Section.

B. Coordinate delivery of bridge to avoid high traffic portions of the day. (6:00 a.m. – 9:00 a.m. and 3:00 p.m. – 6:00 p.m.)

C. The Contractor shall carefully check all abutment grades and dimensions before starting work on the bridge installation.

D. Coordinate the work of this Section with that of other sections of these special provisions.

E. The design is diagrammatic. All items shown on the drawings are for design clarification only.

FIELD QUALITY CONTROL

A. Bridge Superstructure: Bridge superstructure shall be subject to inspection, and no previous inspection shall bar rejection of the completed structure.

B. Bridge Decking: Decking shall be subject to inspection by the Engineer and no previous inspection shall bar rejection of the completed structure.

CLEAN-UP

A. Clean-up shall be made as each portion of work progresses. Refuse and debris shall be removed from the site daily or as otherwise required by these special provisions. Any damage sustained on the work of others shall be repaired to original conditions.

FINAL REVIEW PRIOR TO ACCEPTANCE

A. Final inspection by the Engineer shall take place after submission of specified manuals.

WARRANTY

A. The bridge manufacturer shall fully warrant in writing, naming the County as the owner, the steel structure to be free of design, material and workmanship defects for a period of ten years from the date of delivery. Repair or replacements shall be the exclusive remedy for defects under this warranty.

B. As a condition of the warranty, the manufacturer may require regular bridge inspections in accordance with Title 23 of the Code of Federal Regulations (Federal Highway Act) and the National Bridge Inspection Standards (NBIS). The frequency of inspections shall be determined by the California Department of Transportation, Division of Maintenance,

Structure Maintenance and Investigations. The manufacturer shall not require a specific maintenance regiment, inspection frequency, or adherence to a specific set of bridge inspection standards which conflict or exceed what is required by adherence to the above inspection conditions.

MEASUREMENT AND PAYMENT

The contract lump sum price paid for prefabricated steel bridge shall include full compensation for furnishing all bridge engineering and design services, coordination with the Engineer, labor, materials, tools, equipment, and incidentals and for providing a copy of the warranty to the District as specified in these special provisions and for doing all the work involved in installing the prefabricated steel bridge complete in place as shown on the plans, as required by the bridge manufacturer, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.40 EROSION CONTROL (HYDROSEED)

[District Specification – text from template e-mailed by C. Roner to A. Pujol on 7-12-10. O*nly change was to insert seed types and quantities from C. Roner e-mail dated 5/26/10.*]

GENERAL

Summary

This work includes removing and disposing of weeds, applying erosion control materials, seed, fiber, commercial fertilizer, organic fertilizer, straw, and tackifier to erosion control (Hydroseed) areas shown on the plans.

Comply with Section 20-3, "Erosion Control," of the Standard Specifications.

Apply erosion control (Hydroseed) when an area is ready to receive erosion control as determined by the Engineer and under "Move-In/Move-Out (Erosion Control)" of these special provisions.

If the slope on which the erosion control to be placed is finished during the rainy season as specified under "Water Pollution Control" of these special provisions, apply erosion control to the slope immediately.

The Engineer will designate the ground location of all erosion control (Hydroseed) areas in increments of one acre or smaller by directing the placing of stakes or other suitable markers. Furnish all tools, labor, materials, and transportation required to adequately indicate the various erosion control (Hydroseed) locations.

MATERIALS

Seed

Seed not required to be labeled under the California Food and Agricultural Code must be tested for purity and germination by a seed laboratory certified by the Association of Official Seed Analysts or by a seed technologist certified by the Society of Commercial Seed Technologists. Measure and mix individual seed species in the presence of the Engineer.

Seed must contain at most 1.0 percent total weed seed by weight.

Seed must be free of the following specific weed species: _____, _____, and _____.

Deliver seed to the job site in unopened separate containers with the seed tag attached. Containers without a seed tag attached are not accepted. The Engineer takes a sample of approximately one ounce or 0.25 cup of seed for each seed lot greater than 2 pounds.

Seed must comply with the following:

Seed

Botanical Name (Common Name)	Percent Germination (Minimum)	Pounds Pure Live Seed Per Acre (Slope Measurement)
Bromus carinatus (California brome)		14
Vulpia microstachys (small fescue)		3
Leymus triticoides (creeping wild rye)		10
Hordeum brachyantherum ssp. *brachynatherum* (meadow barley)		14
Nasella pulchra (purple needlegrass)		3
Eschscholzia californica (California poppy)		1
	Total	45

Seed Sampling Supplies

At the time of seed sampling, provide the Engineer a glassine lined bag and custody seal tag for each seed lot sample.

Commercial Fertilizer

Commercial fertilizer shall comply with Section 20-2.02, "Commercial Fertilizer," of the Standard Specifications.

Must have a guaranteed chemical analysis within 10 percent of __ percent nitrogen, __ percent phosphoric acid and __ percent water soluble potash.

Organic Fertilizer

Must be a pelleted or granular form and must be one of the following:

Organic Fertilizer

Products	Guaranteed Chemical Analysis (N-P-K) (%)	Company

Biosol Mix® - Granular	7-2-3	Rocky Mountains Bioproducts Edwards, CO
Fertil-Fibers™	6-4-1	Quattro Environmental Coronado, CA
Sustane®	5-2-4	Natural Fertilizer of America Cannon Falls, MN
Approved Equal[1]	(N) 5 to 7 (P) 1 to 5 (K) 2 to 10	

[1]Approved equal must be within the ranges shown for N-P-K. The cumulative (N) release rate must be no more than 70 percent the first 70 days after incubation (86° F) with 100 percent at 350 days or more.

~~**Straw**~~

~~Comply with "Erosion Control (_____)" of these special provisions.~~

Straw

~~Straw must be:~~

~~1. Wheat~~
~~2. Barley~~
~~3. Wheat and Barley~~
~~4. Wheat or Barley~~
~~5. Rice~~

Straw must be rice.
Straw must be free of plastic, glass, metal, rocks, and refuse or other deleterious material.

Tackifier

Tackifier must be:

1. Guar (Plant Based)
2. Psyllium (Plant Based)
3. Starch (Plant Based)
4. Polymeric Emulsion Blend

Tackifier must comply with the following:

1. Nonflammable
2. Nontoxic to aquatic organisms
3. Free from growth or germination inhibiting factors
4. Either a plant-based product or a polymeric-emulsion blend

Tackifier classified as a plant based product must comply with the following:

1. A natural high molecular weight polysaccharide
2. A high viscosity hydrocolloid that is miscible in water
3. Functional for at least 180 days
4. Labeled as either guar, psyllium, or starch

Guar:

1. A guar gum based product derived from the ground endosperm of the guar plant, cyanmopsis tetragonolobus
2. Treated with dispersant agents for easy mixing
3. Able to be diluted at the rate of 1 to 5 pounds per 100 gallons of water

Psyllium:

1. Made of the finely ground muciloid coating of plantago ovata or plantago ispaghula seeds
2. Able to dry and form a firm but rewettable membrane

Starch:

1. A non-ionic, water-soluble granular material derived from corn, potato, or other plant-based source.

Tackifier classified as polymeric emulsion blend must comply with the following:

1. A liquid or dry powder formulation
2. Anionic with a residual monomer content that is at most 0.05 percent by weight
3. Functional for at least 180 days
4. A prepackaged product labeled as containing one of the following as the primary active ingredient of the polymeric emulsion blend:

4.1 Acrylic copolymers and polymers
4.2 Polymers of methacrylates and acrylates
4.3 Copolymers of sodium acrylates and acrylamides
4.4 Polyacrylamide (PAM) and copolymer of acrylamide
4.5 Hydrocolloid polymers

~~**Fiber**~~

~~Comply with "Erosion Control (_____)" of these special provisions.~~

Fiber

Fiber must be a combination of 50% wood fiber and 50% cellulose fiber.

~~1. Wood~~

~~2. Cellulose~~
~~3. Alternate~~
~~4. A combination of Wood, Cellulose, or Alternate~~

Fiber must comply with the following:

1. Free from lead paint, printing ink, varnish, petroleum products, seed germination inhibitors, or chlorine bleach
2. Free from synthetic or plastic materials
3. At most 7 percent ash

Wood Fiber must comply with the following:

1. Long strand, whole wood fibers, thermo-mechanically processed from clean, whole wood chips
2. Not made from sawdust, cardboard, paper, or paper byproducts
3. At least 25 percent of fibers 3/8 inch long
4. At least 40 percent held on a No. 25 sieve

Cellulose Fiber must comply with the following:

1. Made from natural or recycled pulp fiber, such as wood chips, sawdust, newsprint, chipboard, corrugated cardboard, or a combination of these materials

~~Alternate Fiber must comply with the following:~~

~~1. Long strand, whole natural fibers made from clean straw, cotton, corn, or other natural feed stock~~
~~2. At least 25 percent of fibers 3/8 inch long~~
~~3. At least 40 percent held on a No. 25 sieve~~

Coloring Agent

Use a biodegradable, nontoxic coloring agent free from copper, mercury, and arsenic.

CONSTRUCTION

Site Preparation

Immediately prior to applying seed to erosion control (Hydroseed) areas, trash and debris and weeds must be removed.

Removed weeds must be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Application

Apply erosion control (Hydroseed) materials in separate applications in the following sequence:

1. Apply the following mixture with hydroseeding equipment at the rates indicated within 60 minutes after the seed has been added to the mixture:

Material	Pounds Per Acre (Slope Measurement)
Seed	
Fiber	
Commercial Fertilizer	
Organic Fertilizer	

2. Apply straw at the rate of 2 tons per acre based on slope measurements. Incorporation of straw will not be required. Distribute straw evenly without clumping or piling.
3. Apply the following mixture with hydro-seeding equipment at the corresponding rates:

Material	Pounds Per Acre (Slope Measurement)
Fiber	
Commercial Fertilizer	
Organic Fertilizer	
Tackifier	

The ratio of total water to total tackifier in the mixture must be as recommended by the manufacturer.

Seed may be dry applied at the total rate specified in the preceding table for small areas not accessible by the hydro-seeding equipment, when approved in writing by the Engineer. Dry applied seed must be incorporated into the soil a maximum depth of 1/4 inch by raking or dragging.

Hydraulic application of erosion control (Hydroseed) materials for rolled erosion control product (Netting) areas must be applied by hose, from the ground. Erosion control (Hydroseed) materials must be applied onto the slope face such that the materials are well integrated into the rolled erosion control product (Netting) and in contact with ground surface. Application must be perpendicular to the slope face such that rolled erosion control product (Netting) materials are not damaged or displaced. Once straw work is started in an area, complete tackifier applications in that area on the same working day.

The Engineer may change the rates of erosion control (Hydroseed) materials to meet field conditions.

For any area where erosion control (Hydroseed) materials are to be applied, the application of all erosion control (Hydroseed) materials to be applied to that area must be completed within 72 hours from when the first materials were applied.

MEASUREMENT AND PAYMENT

Erosion control (Hydroseed) will be measured by the acre. The area will be calculated on the basis of actual or computed slope measurements.

The contract price paid per acre for erosion control (Hydroseed) includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved

in erosion control (Hydroseed) complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.41 CEMENT TREATED BASE

[GEI Specification]

Cement treated base (CTB) shall conform to the provisions in Section 27, "Cement Treated Bases," of the Standard Specifications and these special provisions.

GENERAL

A. The CTB mix shall be designed by the Contractor. The CTB mix shall be designed to be relatively impermeable and to meet the requirements of these special provisions.
B. The CTB shall be Class A in accordance with Section 27, "Cement Treated Bases" except that:
   1. A minimum of 5% of the aggregate shall pass the No. 200 sieve for the operating range.
   2. The fines shall be non-plastic or shall have a PI < 5 as determined by California Test 204.
   3. Contract compliance for the aggregate gradation in Section 27-1.02, "Materials" of the Standard Specifications will be the operating range +/- 1 percent, not the tabulated values.
   4. The aggregate shall conform to the following quality requirements:

Quality Requirements

Test	Operating Range	Contract Compliance
Sand Equivalent	31 Min.	28 Min.

   5. The coarse aggregate material retained on the No. 4 sieve shall consist of material of which at least 25 percent by weight shall be crushed particles as determined by California Test 205.
   6. The amount of portland cement shall not be less than 5% and shall not exceed 8% by weight of the dry aggregate unless otherwise approved by the Engineer.
   7. The compressive strength of the compacted CTB shall not be less than 800 psi at 7 days when tested in accordance with ASTM C 39, "Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens."
C. The CTB shall be plant mixed in a Class 1 plant unless otherwise approved by the Engineer. The plant mixer shall not be a rotary drum mixer unless otherwise approved by the Engineer.
D. All vehicles for transporting, placing, spreading, and compacting CTB shall be free of deleterious materials, including, but not limited to soil, rock, or mud and uncompacted, loose, deteriorated, or improperly cured CTB material.
E. Trucks used for hauling CTB shall be covered to protect against moisture loss.
F. CTB shall be spread using a "Type 3 Spreading Operation" in which the Contractor spreads the material using equipment selected by the Contractor, but approved by the Engineer. If track mounted equipment is used, the equipment, the tracks shall be smooth, lugless (less than 1 inch) tracks.
G. The maximum compacted thickness of each layer shall be 0.5 foot, unless otherwise approved by the Engineer.

H. Minimize the total elapsed time between the addition of water to CTB mixture and the beginning of compaction. The maximum transportation time from mixing to delivery at the dam shall be 30 minutes, unless otherwise approved by the Engineer. The maximum elapsed time between adding water to the aggregate and cement mix at the batch plant to the start of compaction shall be 45 minutes.
I. The relative compaction of the CTB shall not be less than 98 percent of the index density determined using ASTM D 558, "Moisture-Density (Unit Weight) Relations of Soil-Cement Mixtures." Immediately prior to compaction, the moisture content of the CTB shall be higher than 2 percent below the optimum water content but less than or equal to the optimum water content as determined using ASTM D 558.
I. For CTB placed against soil slopes, bench into the slope as shown in the plans.
J. Compacted surfaces of CTB that are to receive overlying layers of CTB shall be kept continuously moist until the overlying or adjacent layer of CTB has been placed.
K. Once the placement of CTB begins, the Contractor will work 7 days per week placing CTB until the CTB placement is completed to avoid cold joints from developing between layers to the maximum extent practicable.
L. Transverse joints at stoppages of work shall be trimmed to form straight, beveled joints at an inclination of 1H: 1V (horizontal to vertical). When lanes or areas of CTB are placed in adjacent layers, the longitudinal joints shall be trimmed within 3 hours of placement to form straight, beveled joints at an inclination of 1H:1V prior to placement of the adjacent lane. Transverse joints of adjacent lanes shall be offset by a distance of at least 20 feet to prevent establishing preferential seepage paths in the dam. CTB removed in smoothing or trimming layers after the time limits specified for transporting and compacting the layers shall be wasted.
M. Keep the finished surface of the CTB in a moist condition for a minimum period of 7 days after the completion of CTB placement. Structural concrete will be placed over the CTB, and curing compounds shall not be applied between the CTB and the structural concrete.

SUBMITTALS

The contractor shall submit the following to the Engineer at least 30 days before start of any production of CTB:

A. Proposed CTB Mix Design: The mix design shall include:
   1. Aggregate gradation as determined by California Test 202, modified by California Test 105 if there is a difference in specific gravity of 0.2 or more between the coarse and fine portions of the aggregates.
   2. Aggregate Sand Equivalent as determined by California Test 217.
   3. Plasticity index of aggregate fines, passing the No. 200 sieve, as determined by California Test 204.
   4. Source, product data, and material properties for each constituent in the mix.
   5. Proportions of each constituent included in the mix.
   6. Laboratory procedures for mixing and curing samples.
   7. Moisture density relationship for CTB design mix as determined by ASTM D 558, "Moisture-Density (Unit Weight) Relations of Soil-Cement Mixtures."

8. Unconfined compressive strength of CTB at 7 days, 14 days, and 28 days in accordance with ASTM C 39, "Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens."

B. Certifications: Certifications for portland cement, and certifications for supplementary cementitious materials, if approved by the Engineer.
C. Submit location of mixing plant, mixing plant layout, and certification that the plan meets the requirements of the Standard Specifications and these special provisions. For layout of plant, include schematic layout of mixing plant, cement and aggregate storage, and water supply.
D. Narrative describing methods and equipment for delivering material to the site; placing, spreading, and compacting; maintaining the CTB moisture between lifts; and curing CTB.
E. Types, specifications, and number of pieces of equipment to be used for all operations of mixing, transporting, placing, and compacting CTB.
F. Estimate of the number of days required to complete the CTB placement.
G. An inclement weather (hot, wet, etc.) production plan, including material and equipment to prevent damage to RCC from inclement weather.

QUALITY CONTROL TESTING REQUIREMENTS

The Contractor shall perform quality control for CTB in accordance with 10-1.13, "Contractor Quality Control and Testing." At a minimum, requirements for CTB quality control testing shall include:

A. A minimum of three weeks prior to use, the full amount of aggregate to be used in the manufacture of the CTB shall be delivered to the batching plant or other location approved by the Engineer and stockpiled. The aggregate shall be stockpiled separately from other aggregate sources and shall be protected from contamination by other materials. The Contractor shall collect samples from this stockpile for quality control testing. The Contractor shall determine the minimum sample size required for the quality control testing required by the Standard Specifications and these special provisions and for any additional testing that the Contractor may elect to perform.

   The Contractor shall notify the Engineer a minimum of one week prior to collecting the quality control samples, and the Contractor shall provide access for the Engineer to observe collection of the quality control samples.

   Quality control samples shall be collected from the aggregate stockpile as follows:

   1. Divide the stockpile into quarters. Delineate each quarter using stakes or other method approved by the engineer.
   2. At a distance of approximately 1/3 the stockpile height from the base, excavate an approximately 3- to 4-foot-deep pit in each quadrant, and collect a sample from the bottom of each pit. The sample collected from each pit shall be approximately 1/8 the sample size required for the quality control testing.
   3. At a distance of approximately 2/3 the stockpile height from the base, excavate an approximately 3- to 4-foot-deep pit in each quadrant, and collect a sample from the

bottom of each pit. The sample collected from each pit shall be approximately 1/8 the sample size required for the quality control testing.

4. At the laboratory, combine the eight samples collected from the stockpile, and mix the samples to develop a relatively uniform, representative sample of the stockpile.

B. At a minimum, the Contractor shall perform the following quality control testing on the aggregate material collected from the stockpile:

1. Aggregate gradation testing in accordance with California Test 202.
2. Moisture content in accordance with California Test 226.
3. Liquid Limit, Plastic Limit, and Plasticity Index on material finer than the No. 200 sieve in accordance with California Test 204.

C. The contractor shall prepare a batch of CTB based on the Contractor's approved mix design using the aggregate material collected from the stockpile and water and cement from the proposed sources. At a minimum, the Contractor shall perform the following quality control testing:

1. Determine the moisture-density relationship of the material in accordance with ASTM D 558.
2. Unconfined compressive strength of CTB at 7 days and 14 days in accordance with ASTM C 39.

D. During CTB placement, the Contractor shall perform the following testing:

1. For each lift of material placed or every 100 cubic yards of material placed, whichever is less, measure the compacted density using either California Test 231 or California Test 216. The measured compacted density shall be at least 98% of the maximum dry density as determined in accordance with ASTM D 558. The material represented by failing tests shall be removed and replaced with material meeting the specification.
2. For each lift of material placed or every 100 cubic yards, whichever is less, measure the moisture content immediately prior to compaction. The moisture content shall be within 2% of the optimum moisture content as determined by ASTM D588.

MEASUREMENT

The quantity of Cement Treated Base to be paid for will be measured by the cubic yard to the neat lines shown on the project plans or as approved by the Engineer.

PAYMENT

Full compensation for Cement Treated Base shall be considered as included in the unit price bid for Cement Treated Base and no additional compensation shall be allowed therefor.

The price bid per cubic yard for Cement Treated Base shall include full compensation for all labor, materials, tools, equipment, and incidentals, and for doing all work involved in Cement Treated Base, as shown on the plans, as specified herein, and as directed by the Engineer. Payment for Cement Treated Base shall include all costs associated with procuring, processing, moisture

conditioning, transporting, placing, spreading, compacting, and testing the Cement Treated Base as shown on the plans and as specified herein.